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VOLUME II.

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TABLE OF CONTENTS.

Part 2.—*Continued.*

DISEASES OF THE FEMALE PELVIC ORGANS.

SECTION V.—*Continued.*

AFFECTIONS OF THE UTERUS.

CHAPTER XXX.

METRITIS, ACUTE AND CHRONIC; SUBINVOLUTION.....

ACUTE METRITIS.....

Pathology, 3; Etiology, 4; Symptoms, 4; Physical Signs, 4; Progress and Termination, 4; Diagnosis, 5; Prognosis, 5; Treatment, 5.

CHRONIC METRITIS.....

Pathology, 7; Etiology, 8; Symptoms, 10; Physical Signs, Diagnosis, 11; Differential Diagnosis, 11; Treatment, 12.

CHAPTER XXXI.

DISPLACEMENTS OF THE UTERUS; ANTEFLEXION; ANTEVERSION; RETROVERSION; RETROFLEXION.....

DISPLACEMENTS OF THE UTERUS.....

ANTEFLEXION.....

Pathology, 20; Etiology, 22; Symptoms, 24; Physical Diagnosis, 26; Differential Diagnosis, 27; Prognosis, 28; Treatment, 28.

ANTEVERSION.....

Pathology, 33; Etiology, 33; Symptoms, 33; Diagnosis, 34; Treatment, 35.

RETROVERSION.....

Pathology and Etiology, 37; Symptoms, 38; Diagnosis, 38; Treatment, 39.

PAGE

RETROFLEXION=RETROVERSION+RETROFLEXION 39

Pathology, 39; Etiology, 42; Symptoms, 43; Diagnosis, 45; Differential Diagnosis, 46; Prognosis, 47; Treatment, 48; Replacement by Bimanual, 49; with the Sound, 50; by Genupectoral Posture, 52; Retaining the Replaced Uterus by Pessaries, 53.

CHAPTER XXXII.

INVERSION OF UTERUS 61

Pathology, 61; Etiology and Frequency, 65; Symptoms, 66; Diagnosis, 67; Differential Diagnosis, 68; Course and Results of Chronic Inversion, 71; Prognosis, 71; Treatment, 71; Reposition, 72; Amputation, 77.

CHAPTER XXXIII.

FIBROID TUMOURS OF THE UTERUS; PATHOLOGY AND ETIOLOGY 80

PATHOLOGY 80

Situation, 80; Structure, 81; Mode of Growth, Varieties, 83; Changes in the Uterus, 87; Degenerative Changes, 88; Fibroid Tumours of the Cervix, 89.

ETIOLOGY 90

CHAPTER XXXIV.

FIBROID TUMOURS OF THE UTERUS; SYMPTOMS; DIAGNOSIS; PROGNOSIS ... 92

SYMPTOMS 92

Menorrhagia, Irregular Hemorrhages, 92; Painful Menstruation, 93; Sensations due to Size and Weight of Tumour, 94; Pressure Symptoms, 94; Progress and Results, 95.

PHYSICAL SIGNS; DIFFERENTIAL DIAGNOSIS 96

Of Small Fibroid Tumours, 97; of Large Fibroid Tumours, 99.

PROGNOSIS 101

CHAPTER XXXV.

FIBROID TUMOURS OF THE UTERUS; TREATMENT 102

MEDICAL TREATMENT 102

SURGICAL TREATMENT 104

Removal through the Vagina, 104; Removal through the Abdominal Walls by Laparotomy, 108.

CHAPTER XXXVI.

FIBROCYSTIC TUMOUR OF THE UTERUS 116

Pathology, 116; Symptoms, 118; Diagnosis, Differential Diagnosis, 118; Treatment, 118.

CHAPTER XXXVII.

PAGE

POLYPI OF THE UTERUS 119

Varieties, 119; Symptoms, 124; Diagnosis, 125; Differential Diagnosis, 127; Prognosis, 129; Treatment, 129.

CHAPTER XXXVIII.

CARCINOMA UTERI (OF CERVIX); PATHOLOGY AND ETIOLOGY 132

PATHOLOGY 132

Classification, 132; Origin, 134; Position, 135; Progress, 135; Extension to Neighbouring Organs, 136.

ETIOLOGY 139

General Predisposing Causes, 139; Local Predisposing Causes, 141.

CHAPTER XXXIX.

CARCINOMA UTERI (OF CERVIX); SYMPTOMS AND DIAGNOSIS 143

SYMPTOMS 143

Local Symptoms: Hemorrhage, 143; Offensive Discharge, 144; Pain, 144; General Symptoms, 145.

DIAGNOSIS 146

Differential Diagnosis, 148.

PROGNOSIS 150

Causes of Death, 150.

CHAPTER XL.

CARCINOMA UTERI (OF CERVIX); TREATMENT 153

TREATMENT OF SYMPTOMS 154

Hemorrhage, 154; Offensive Discharge, 155; Pain, 155.

TREATMENT OF THE DISEASE 156

Application of Caustics, 157; Scraping out of Diseased Tissue, 158; Amputation of the Cervix, 159; Ecraseur or Galvano-cautery, 159; Knife and Scissors, with Ligature or Caustics, 164; Excision of the whole Uterus, 166; By Abdominal Excision (Freund's method), 166; Through the Vagina, 169.

CHAPTER XLI.

CARCINOMA OF THE BODY OF THE UTERUS 171

Pathology and Etiology, 171; Symptoms and Diagnosis, 172; Treatment, 173.

CHAPTER XLII.

SARCOMA UTERI 174

Pathology, 174; Etiology and Frequency, 178; Symptoms, 179; Diagnosis, 179; Prognosis, 181; Treatment, 181.

SECTION VI.

AFFECTIONS OF THE VAGINA.

CHAPTER XLIII.

PAGE

ATRESIA VAGINÆ 185

Pathology: Atresia Hymenalis, 185; Atresia Vaginalis, 186; Etiology, 188; Symptoms, 189; Diagnosis, 189; Prognosis, 191; Treatment, 192; Operation for Imperforate Hymen, 193; for Atresia Vaginæ, 193; for Atresia of the Cervix, 195; Atresia of one-half of a Septate Uterus and Vagina, 196.

CHAPTER XLIV.

VAGINITUS; VAGINISMUS 198

Nature and Varieties, 198; Pathology, 199; Etiology, 200; Symptoms, 201; Diagnosis, 201; Treatment, 202.

VAGINISMUS 203

Etiology, 203; Symptoms and Diagnosis, 204; Treatment, 204; Sims' Operation, 205.

TUMORS OF THE VAGINA 206

Cysts of the Vagina, 206; Fibroid Tumors of the Vagina, 207; Carcinoma of the Vagina, 208; Sarcoma Vaginæ, 208.

SECTION VII.

AFFECTIONS OF THE VULVA AND PELVIC FLOOR.

CHAPTER XLV.

THE VULVA: MALFORMATIONS; INFLAMMATION; TUMOURS 211

MALFORMATIONS 211

Hermaphroditism: True, 212; False, 213.

INFLAMMATION OF THE VULVA (VULVITIS) 215

Pruritus Vulvæ, 216; Eruptions on the Vulva, 218.

TUMOURS OF THE VULVA 218

CHAPTER XLVI.

RUPTURE OF THE PERINEUM AND ITS OPERATIVE TREATMENT 222

Nomenclature, 222; Pathology and Varieties, 224; Etiology, 224; Treatment: Prophylactic, 225; Operative—immediate, 226; deferred, 226.

CHAPTER XLVII.

DISPLACEMENTS OF THE PELVIC FLOOR; PROLAPSUS UTERI; VAGINAL INTEROCELE 231

PAGE

PROLAPSUS UTERI 231
Structural and Anatomical Preliminaries, 231; Symptoms and Physical Signs, 232; Mechanism of Prolapsus, 232; Diagnosis and Differential Diagnosis, 234; Etiology, 234; Nature, 235; Treatment, by Pessaries, 236; Treatment, by Operation, 238; Repair of Perineum, 239; Repair of Perineum and Paring of Posterior Vaginal Wall, 240; Making Raw Surface on Anterior Vaginal Wall, 241; Making Raw Surface on both Walls, etc., 241.

VAGINAL INTEROCELE 242
Treatment, 243.

SECTION VIII.

DISTURBANCES OF THE MENSTRUAL FUNCTION.

CHAPTER XLVIII.

AMENORRHŒA; MENORRHAGIA; DYSMENORRHŒA 247

AMENORRHŒA 247
Local Conditions, 247; Constitutional Conditions, 247.

MENORRHAGIA 248

DYSMENORRHŒA 249
Varieties, 250; Treatment, 252.

SECTION IX.

DISTURBANCES OF THE REPRODUCTIVE FUNCTION.

CHAPTER XLIX.

STERILITY; ABORTION; RETROFLEXION OF THE GRAVID UTERUS 257

STERILITY 257

ABORTION 258

RETROFLEXION OF THE GRAVID UTERUS 260

CHAPTER L.

EXTRA-UTERINE GESTATION 262
Pathology, 262; Etiology, 265; Symptoms and Diagnosis, 266; Progress and Termination, 268; Treatment, 269; Case of, 269.

SECTION X.

AFFECTIONS OF BLADDER AND RECTUM.

CHAPTER LI.

THE BLADDER: ANATOMY, PHYSIOLOGY AND METHODS OF EXAMINATION 275
Anatomy and Physiology, 275; Exploration by Catheter and Sound, 277; Finger and Speculum, 278; Catheterisation of the Ureter, 281.

CHAPTER LII.

PAGE

AFFECTIONS OF THE BLADDER AND URETHRA 283

Malformations of the Bladder and Urethra, 283; Diseases of the Urethra, 283; Neoplasms; Urethral Caruncle, 283; Urethritis, 285; Dilatation and Stricture, 285.

DISEASES OF THE BLADDER 285

Displacements, 285; Cystocele, 286; Neoplasms, 286; Cystitis, 287; Calculi and other Foreign Bodies in the Bladder, 290; Functional Diseases, 291.

CHAPTER LIII.

VESICO-VAGINAL FISTULA 294

Pathological Anatomy and Varieties, 294; Etiology, 297; Symptoms, 298; Diagnosis, 299; Prognosis, 299; Treatment, 300; Operation for Closure by Sutures, 302; Obliteration by Cauterisation, 312; Closure of the Vagina: Kolpokleisis, 313.

CHAPTER LIV.

THE RECTUM; COCCYGODYNIA 316

THE RECTUM 316

Physiology, 316; Examination, 318; Diseases, 318; Displacements of the Rectum, 319; Fissure of the Anus, 319; Piles, 321; Recto-vaginal fistula, 322; Functional Disturbance; Constipation, 322.

COCCYGODYNIA 323

APPENDIX.

SYPHILIS 327

Phenomena of an Attack, 327; Table of Leading Facts, 328; Treatment, 332; Syphilis and Marriage, 333; Syphilis and Pregnancy, 334.

CHLOROSIS 337

Nature and Pathology, 337; Symptoms and Physical Signs, 337; Diagnosis, 338; Prognosis, 338; Treatment, 338.

ETIOLOGY OF UTERINE DISEASE 340

CASE-TAKING 341

SOURCES OF GYNECOLOGICAL LITERATURE 346

INDEX OF AUTHORS 349

INDEX OF SUBJECTS 353

CLASSIFIED LIST OF ILLUSTRATIONS IN THIS VOLUME.

To facilitate study, we have grouped the illustrations under the following heads:

Anatomy—naked eye.
Sectional anatomy.
Pathology—naked eye.
Pathology—microscopic.
Charts of etiology.
Gynecological examination.
Instruments.
Operations.

ANATOMY—NAKED EYE.

Fig. Page
319 Sacral segment of the pelvic floor 222
350 Bladder in systole 276
360 Normal relations of the cervix, the ureters, and the urethra... 296
395 Direction of rectum and of anus in relation to intra-abdominal pressure 317

SECTIONAL ANATOMY.

PLATE IX. Vertical mesial section of pelvis with extra-uterine gestation—frozen ..... facing p. 271

Fig. Page
274 Vertical mesial section of pelvis from a case of carcinoma uteri —spirit hardened 137
275 Vertical mesial section of pelvis from a case of carcinoma uteri et vaginæ—spirit hardened.... 138

PATHOLOGY—NAKED EYE.

Fig. Page
194 Diagrammatic scheme of flexions. 18
195 Diagrammatic scheme of versions 18
196 Anteflexion with stenosis at os externum 21
197 Diagram to show anteflexion produced by cicatrisation of utero-sacral ligaments..... 22
198 Myoma of anterior wall..... 28
206 Uterus retroverted and bound back by peritonitic adhesions.. 38
207 Extreme retroflexion of uterus... 41
208 Congenital retroflexion..... 41
221 Inversion of uterus..... 63
222 Inversion of uterus+inversion of vagina, caused by a small submucous fibroid..... 64
223 Inversion of uterus..... 65
236 Section of a large fibroid tumour, with the fibres arranged round several centres..... 81

Fig.		Page
237	Section of a fibroid tumour showing wavy bundles of fibrous tissue	82
238	Section of a fibroid tumour, showing spaces between bundles of fibrous tissue	82
239	Pediculated sub-peritoneal fibroid tumour	83
240	Uterus with elongated cavity due to presence of several fibroids	84
241	Interstitial fibroid tumour	85
242	Submucous fibroid tumour projecting into uterine cavity	86
243	Pediculated submucous fibroid in process of extrusion	87
244	Cervical polypus having apparently two pedicles	89
246	Uterus containing large fibroid tumour	93
247	Case of two and-a-half months' pregnancy associated with two large fibroids	98
260	Large three-lobed fibroid from the fundus	117
261	Fibrous polypus laid open to show its identity in structure with a fibroid tumour	120
262	Intra-uterine submucous fibroid becoming vaginal	121
263	Submucous fibroid which has come to be wholly in the vagina	122
264	Group of mucous polypi growing in the cervix uteri	123
266	Pediculated submucous fibroid	126
267	Submucous fibroid which simulated Inversion	128
270	Carcinomatous nodule	134
273	Carcinoma of cervix uteri producing fistula	137
274	Vertical mesial section of pelvis in carcinoma uteri	137
275	Vertical mesial section of pelvis in carcinoma vaginæ et uteri	138
278	Cauliflower excrescence growing from cervix uteri	147
280	Carcinoma of the cervix leading to occlusion of os uteri	152
281	Mode of the spreading of carcinoma	156
286	Cervix uteri amputated for cauliflower excrescence of posterior lip	162
291	Carcinoma of the body of the uterus	172
292	Sarcoma uteri with tumours in the vagina	175
294	Section of sarcoma uteri, showing fibroid nodules	176
295	Sarcoma uteri invading Fallopian tubes	177
298	Atresia vaginæ, seen from behind	186
299	Case of double atresia	187
300	Atresia hymenalis	190
301	Atresia vaginæ—lower third	190
302	Atresia of cervix at os externum	191
303	Atresia of cervix at os internum	191
306	Atresia in a septate uterus	196
311–315	Normal development of external organs of generation	211, 212
316, 317	Cases of spurious hermaphroditism	213, 214
318	Abscess of the Bartholinian gland	219
320	Central rupture of the perineum	223
326	Hernial nature of prolapsus uteri	235
340	Posterior vaginal enterocele	243
341	Dysmenorrhœal membrane as seen under water	251
342	Dysmenorrhœal membrane laid open	252
343	Retroflexion of gravid uterus producing distention of bladder	261
344	Gestation in detached left horn	263
345	Interstitial gestation	264
346	Fallopian tube gestation	265
347	Section of a uterus in a tubo-abdominal pregnancy of seven months' duration	266
349	Extra-uterine pregnancy of seven months' duration	272
355	Caruncle at urethral orifice	284
356	Large stone extracted by vaginal lithotomy	289
357	Chief varieties of urinary fistula	295
358, 359	Deep and superficial vesico-vaginal fistula	295
361	Relation of peritoneum to a fistula	297
396	Rectocele	319
398	Teeth in hereditary syphilis	336

PATHOLOGY—MICROSCOPIC.

Fig.		Page
193	Section of uterine tissue in chronic metritis	8
265	Section of a mucous polypus of the cervix	123
271	Section of a portion of cervix uteri with carcinomatous nodule	135
272	Section of a flat cancroid of the cervix	136
279	Scraping from carcinoma of the cervix	147
293	Section of mucous membrane in sarcoma	176
296	Scraping from a fibroid tumour	180
297	Scraping from a spindle-celled sarcoma	181
307	Granular vaginitis—acute form	199
308	Granular vaginitis—chronic form	199
309	Colpitis emphysematosa	200
310	Section of vaginal cyst	206

CHARTS OF ETIOLOGY.

Fig.		Page
245	Table and diagram showing frequency of fibroid tumours according to age of patient	91
276	Table and diagram of comparative fatality of carcinoma in male and female	140
277	Influence of age on development of carcinoma	142

GYNECOLOGICAL EXAMINATION.

Fig.		Page
198	Diagnosis between fibroid and anteflexion	28
209	Diagnosis of retroflexion by bimanual	45
225, 226, 227	Diagnosis of inversion and polypus in vagina	69
228, 229	Diagnosis of partial inversion and intra-uterine polypus	70
230	Uterine polypus + Inversion	70
248	Sounds used to detect pediculated submucous fibroid	100
300, 303	Diagnosis of various forms of atresia	190, 191
354	Catheterisation of ureters	281
399–401	Diagrams for case-taking	343–345

INSTRUMENTS.

Fig.		Page
199	Intra-uterine stem pessary made of copper	29
200	Greenhalgh's intra-uterine stem	30
202	Graily Hewitt's cradle pessary	35
203	Gehrung's anteversion pessary	36
204	Gehrung's anteversion pessary as placed by Mundé	36
205	Thomas' anteversion pessary	37
213	Hodge pessary	53
214	Albert Smith pessary	54
215	Side view of Albert Smith pessary	54
218	Hodge pessary *in situ ad naturam*	57
219	Position and support of pessary illustrated	57
220	Position and action of pessary in vagina	58
249	A. R. Simpson's nail-curette for fibroids	106
250	Thomas' spoon-saw	106
251	Sims' enucleator	106
252	Sir J. Y. Simpson's volsella for intra-uterine fibroids	107
255	Thomas' clamp for pedicle of fibroids	112
256	Péan's curved needle for ligaturing pedicle of fibroids	112
257	Cintrat's serre-nœud	113
258	Kaltenbach's needle for elastic ligature	114
268	Forceps with catch for mucous polypi	130
269	Sir J. Y. Simpson's polyptome	131
282	Simon's sharp spoon	158

Fig.		Page
283	Chain ecraseur	159
304	Perforated glass plug used after operation for atresia vaginæ	194
305	Breisky's instruments for operating in atresia with retention	195
327	Greenhalgh's pessary with transverse bars	236
328	Ring pessary with diaphragm	236
329	Simple ring pessary	236
330	Ring pessary *in situ*	237
331	Pessary for prolapsus	237
332	Zwanck's pessary	237
351, 352	Simon's urethral specula	279
353	Skene's urethral specula	280
356	Skene-Goodman self-retaining catheter	289
365, 366, 367	Knives for operating on fistulæ	303
368	Sponge-holder	303
369, 370	Sir J. Y. Simpson's tubular needle and method of use	304
373, 374	Bozeman's fork and method of use	306
378	Bozeman's suture adjuster	308
379, 380	Coghill's wire-twister and method of use	308

OPERATIONS.

Fig.		Page
201	Sims' division of cervix, lines of incision	31
210	Reposition of retroflexed uterus by finger in rectum	49
211	Reposition of retroverted uterus with the sound	51
212	Reposition of uterus with volsella, and finger in rectum	52
216	Introduction of pessary	55
217	Pessary carried on by finger	56
224	Drawing-down of inverted uterus with tape-noose and lines of incision for Barnes' operation	68
231	Reposition of inverted uterus with the hand	72
232	Reposition of inverted uterus with White's repositor	73
233	Reposition of inverted uterus with finger in bladder and rectum	74
234	Emmet's method of retaining partially replaced uterus with sutures	75
235	Cup with stem for gradual reduction of inversion	76
253	Schroeder's amputation of uterus at level of os internum	110
254	Ligature of uterine stump treated intra-peritoneally	111
259	Extra-peritoneal treatment, with elastic ligature, of pedicle of fibroids	115
284	Wire ecraseur used to amputate cervix	160
285	Chain ecraseur applied to cervix in amputation	161
287	Schroeder's supravaginal amputation of cervix	164
288	Sims' method of removing carcinomatous cervix	165
289, 290	Freund's extirpation of the uterus	167
321–323	A. R. Simpson's operation for complete rupture of the perineum	228, 229
324	Position of sutures in above, as seen in section	229
325	Hildebrandt's method of passing sutures in repair of perineum	230
329	Introduction of ring pessary	236
333–336	Operation for repair of perineum	238–240
337	Various forms of raw surface made on posterior vaginal wall in operation for prolapsus	240
338	Raw surface as made by Martin	241
339	Raw surface on anterior vaginal wall, as made by Sims	241
358	Closure of superficial vesico-vaginal fistula	295
359	Closure of deep vesico-vaginal fistula	295
361	Relations of peritoneum to extensive fistula	297
362	Simon's method of paring edges of fistula	300

Fig. Page

363 Silk sutures passed to close fistula 301

364 American and German methods of paring edges of fistula, contrasted 301

371 Knife transfixing edges of a fistula 305

372 Fistula closed with sutures 305

374 Fork used to prevent sutures from cutting 306

375 Counter-pressure made with blunt hook 306

376, 380 Method of twisting the sutures 307, 308

377 Mode of tying wire sutures 307

381, 382 Bozeman's method of fixing sutures with plates and shot ... 308

383, 392 Removal of sutures 308

384, 385 Closure of a four-cornered fistula 309

386 Anterior lip of cervix used to close fistula 309

387 Cervix split and stitched in closure of a fistula 310

388 Obliteration of cervical canal for vesico-uterine fistula 310

389 Operation for atresia urethræ in fistula 311

390, 391 Sims' stationary catheter 311

393, 394 Simon's operation for closure of vagina: kolpokleisis 314, 315

397 Division of base of anal fissure ... 320

PART II.—*Continued.*

DISEASES OF THE FEMALE PELVIC ORGANS.

SECTION V.—*Continued.*

AFFECTIONS OF THE UTERUS.

CHAPTER XXX.

METRITIS, ACUTE AND CHRONIC: SUBINVOLUTION.

LITERATURE.

Barnes—Op. cit., p. 507. *Bennet, J. H.*—Practical Treatise on Inflammation of the Uterus: London, 1853. *De Sinéty*—Op. cit., pp. 315 and 351. *Gallard*—Traitement de la Métrite Chronique. Bull. gén. de thérapeut., etc., 1879, T. XCVII. 4—12 liv. *Guérin*—Ann. de Gyn., 1878, Tom. II., p. 9. *Klob*—Op. cit., S. 124; *Scanzoni*—Die chronische Metritis: Wien, 1863. *Schræder*.—Op. cit., S. 84. *Simpson, Sir J. Y.*—Op. cit., p. 585. *Thomas*—Op. cit., p. 307.

DEFINITION.—Inflammation in the muscular coat of the uterus leading, when chronic, to increased formation of connective tissue.

ACUTE METRITIS.

PATHOLOGY.

The uterus is enlarged and may be of the size of a goose's egg; it is thickened, especially antero-posteriorly, and of a doughy consistence. The peritoneal surface is usually covered with lymph.

On section the muscular wall is thickened, but soft and pulpy; the cut surface is of a bright red colour, shows the veins to be engorged, and yields on compression a yellowish red exudation. The mucous membrane is thickened and vascular, but the cavity of the uterus is not altered in size. Microscopically, the muscular bundles are infiltrated with pus corpuscles.

ETIOLOGY.

Acute metritis is produced by extension of inflammatory action from the mucous or serous lining of the uterus to the intervening muscular tissue. It occurs most commonly as part of the general inflammation produced by absorption of septic matter during the puerperium. It also arises from exposure to cold at a menstrual period—the active congestion passing readily into acute inflammation, from gonorrhœal infection and immoderate sexual activity.

Frequently it is the result of surgical interference :—careless use of sound, intra-uterine injections, pessaries and sponge-tents ; scraping the uterus for the removal of submucous fibroids, operations on the cervix ; and even after vaginal injections of too hot or too cold water.

SYMPTOMS.

There is fever and general constitutional disturbance varying with the intensity of the inflammation. The onset may be marked with rigors. There is a sensation of fulness, weight, and burning heat in the pelvis ; pain in the hypogastric and sacral regions, aggravated on movement of the body or emptying the bladder and rectum ; nausea and vomiting, diarrhœa and tenesmus of rectum and bladder.

Menstruation is suppressed in those cases where the metritis is occasioned by exposure to cold at the menstrual period. In other cases it is diminished in amount ; exceptionally, there is menorrhagia.

PHYSICAL SIGNS.

There is tenderness on pressure in the hypogastric region. On vaginal examination, the vaginal walls are hot and dry, the cervix is swollen and movement of it causes pain ; there is tenderness in all the fornices. The bimanual examination cannot be made on account of the pain and the resistance of the abdominal walls ; if the patient be put under chloroform, the uterus will be felt to be enlarged but freely movable unless fixed by old adhesions (Fig. 206). The sound should not be used, as it causes hemorrhage from the vascular mucous membrane.

PROGRESS AND TERMINATION.

The acute symptoms do not last usually more than a week. The fever and pain diminish ; there is less heat in the pelvis and vagina, and leu-

corrhœal discharge becomes free. As complications, there may be catarrh of the bladder, rectum, or vagina.

The acute *usually* passes into the chronic stage to be immediately described; though *sometimes*, under proper treatment and care, there is resolution with absorption of the exudation; rarely does it terminate in abscess formation. Circumscribed abscesses in the uterine walls—recorded by Scanzoni, Reinmann, Bird, Ashford, Schroeder, Macdonald, and others—are sometimes produced and burst into the uterus itself; or adhesions may form and perforation take place into the bladder, vagina, rectum, and intestines, or even through the abdominal walls.

DIAGNOSIS.

The diagnosis that there is acute metritis and *nothing more*, is a refinement to which few would lay claim. But if the symptoms and physical signs are as described above, if the uterus be freely movable and no deposit is felt in the fornices, we may conclude that acute metritis is the prominent lesion. The possibility of abscess-formation should be kept in view.

PROGNOSIS.

The *immediate result* will depend on the extent to which the peritoneum is involved. Even when the attack is not severe, the liability to pass into a chronic intractable condition makes us guarded in giving an opinion as to *complete recovery*.

TREATMENT.

If the metritis is supposed to be due to a septic cause, the first measure indicated is the *removal of that cause*. Thus if it come on during the puerperium, if the lochia are fetid and we suspect that a portion of the placenta has been retained, the uterine cavity should be washed out with an injection of 1 to 40 carbolic solution. Great care must be taken not to introduce air with the injected fluid.

In all cases of metritis, the inflamed uterus must be kept *at rest*. This is done by keeping the patient recumbent. The bowels are evacuated by an enema—not by purgatives—followed by a morphia suppository. Pain is relieved by warm fomentations, to which turpentine may be added, applied over the lower part of the abdomen; but if it be severe, the patient

should be kept under the influence of opium as already described in the treatment of Pelvic Peritonitis. If the temperature be above 100°, quinine should be given—10 grains every two or three hours—till it falls. The sulpho-carbolate of soda is useful in some cases.

CHRONIC METRITIS.

Synonyms.—Chronic parenchymatous inflammation (Scanzoni), Diffuse proliferation of connective tissue (Klob), Infaret (Kiwisch), Areolar hyperplasia (Thomas).

There has been great divergence of opinion among gynecologists as to the term which should be applied to the changes occurring in chronic metritis. Virchow describes the process as a hyperplasia of fibro-muscular tissue, and places chronic metritis alongside of fibroid tumours of the uterus. Klob classes it among the new formations, and characterises it as "die diffuse Bindegewebschwerung"—"diffuse proliferation of connective tissue." Thomas calls it "Areolar Hyperplasia," and Noeggerath has suggested the term "diffuse *interstitial* metritis."

From a *pathological point of view* the term "metritis" is incorrect, because there has never been demonstrated a chronic inflammation of the muscular fibre of the uterus. The morbid process described as chronic metritis consists in an *increase of connective tissue* out of proportion to that of the muscular fibre, which remains normal or is but slightly increased in quantity. We are not yet in a position to propose a term resting on a sure pathological basis; to do this would require a complete knowledge of the pathological changes, which has not yet been attained. We prefer to retain the term, "chronic metritis."

From a *clinical point of view*, this term is very convenient, including a variety of cases of different origin but presenting the same clinical features on examination.

It may be objected that to apply the term "chronic inflammation" to *the process* is misleading, as it implies a previous acute stage which is rarely present; the process would be more correctly described as an increased connective-tissue formation dependent on long-continued hyperæmia. But the term chronic inflammation is applied to the process producing similar changes in other organs, as cirrhosis of the liver; chronic metritis produces, in fact, cirrhosis of the uterus.

We have brought "subinvolution of the uterus" under this head,

though in other English text-books it is treated as a separate lesion. The term subinvolution is *etiological* and simply expresses one mode, the most important one, in which the condition to be described is produced. *Apart from the history*, it is not possible to diagnose between a subinvoluted uterus and one enlarged by chronic metritis alone. Further, the condition of subinvolution is maintained by the process of chronic metritis, that is, by the formation of connective tissue which takes the place of the fattily degenerated muscular fibre. Finally, the treatment is the same in both cases.

PATHOLOGY.

The condition of the uterus depends on the duration of the disease. At an early stage (as in cirrhosis of the liver) the organ is enlarged, hyperæmic, and soft; at a later period it is indurated, anæmic, and hard. The peritoneal surface is of normal colour, or shows here and there patches of extravasated blood. The enlargement is uniform, so that the shape of the uterus is not altered.

On section, the tissue is soft and hyperæmic in the early stage; firm, cartilaginous, and of a whitish colour (from the compression of the capillaries by the cicatricial tissue) in a later stage. The uterine walls are increased in thickness. The uterine cavity is increased in size and, from the stiffening of the walls, more roomy.

"In the first period," says de Sinéty,[1] "the dominant lesion is the presence in great number of embryonic elements throughout the whole thickness of the muscular wall. These elements are met with specially round the blood-vessels, or form islands of variable dimensions which are more or less apart." The second period is characterized by two changes: (1) Marked dilatation of the lymphatic spaces, and (2) a localized hyperplasia of the connective tissue round the blood-vessels (Fig. 193). The sclerosis, for such it may be called, differs from a similar change in the kidney or liver in the fact that the formation of connective tissue is localized round the blood-vessel. In the case described by de Sinéty, he says that it was difficult to say whether the muscular tissue was normal or diminished in quantity.

Snow Beck[2] also describes the presence of "increased amount of round and oval globules, with amorphous tissue in the uterine walls"

[1] Gynecologie, p. 354.

[2] Lond. Obst. Trans., vol. xiii., p. 239.

The increase in the size of the uterus is due to the presence of the soft tissue rather than to an increase in the muscular fibre.

On the other hand, Finn [1] gives the following result of his investigation of the pathology of chronic metritis: The muscular fibres are increased in length and breadth and number, though their disposition is

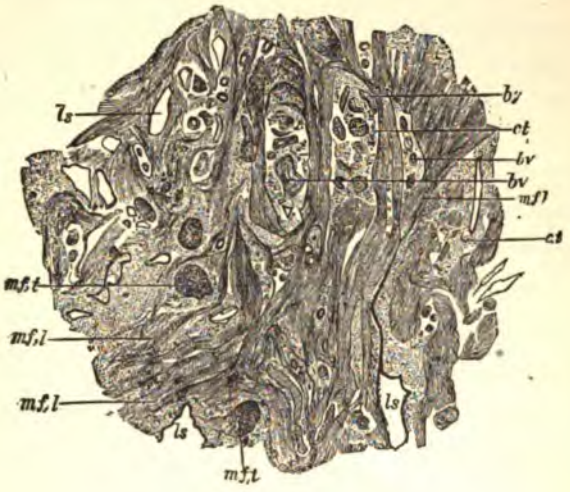

Fig. 193.

Section of the uterine tissue in a case of chronic metritis (40/1). *ct*, connective tissue round the blood-vessels, *bv*. : *ls*, dilated lymphatic spaces; *mf, l*, muscular fibre cut longitudinally; *mf, t*, muscular fibre cut transversely (de Sinéty).

not altered; the amount of connective tissue is relatively diminished. Finn's observations have not been supported by any other investigators.

We may therefore sum up the microscopic changes of the second stage as an increase in the amount of connective tissue with a relative and perhaps absolute diminution in the muscular fibre.

ETIOLOGY.

The causes of chronic metritis may be arranged under two heads:

A. Causes which operate through interferences with the normal involution of the puerperal uterus;

B. Causes which operate through the production of repeated or protracted congestion of the uterus.

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[1] Centralblatt f. Gyn., 1868, S. 564.

A. Causes which Operate through Interference with the Normal Involution of the Uterus.

(1.) Retention of portions of placenta, membranes, or blood-clot in the uterus ;
(2.) Lacerations of the cervix uteri ;
(3.) Pelvic inflammations, occurring after labour ;
(4.) Rising too soon after delivery ;
(5.) Non-lactation ;
(6.) Repeated miscarriages.

In the process of involution there are two factors, the fatty degeneration of the muscular fibre and the removal of the products of this degeneration. The condition of permanent enlargement of subinvolution is not due to the non-degeneration of muscular fibre, but to the substitution of connective tissue for the products of this degeneration. This seems to be the reason why the process of chronic metritis is met with more frequently in those who have borne children ; if there be a tendency to hyperæmia leading to connective tissue formation in the uterus, the most favourable circumstances for such formation occur during the process of involution (Thomas).

Any source of irritation in or beside the uterus leads to chronic metritis ; in this way we explain the effect of the *retention of portions of placenta or membranes.* An extensive *laceration of the cervix,* Emmet says, favours subinvolution for a similar reason. Continued *cellulitis or peritonitis* acts in the same way, or through interference with the circulation. If the patient *rise too soon,* the increased weight of the non-involuted uterus leads to passive congestion and formation of connective tissue. Passive congestion will, on the other hand, be diminished by whatever produces uterine contractions ; the physiological stimulus of suckling, excited reflexly through the mammæ, favours involution ; in *non-lactation* this stimulus is absent. *Abortions* are an important cause ; because patients do not take so much care of themselves as after a full-time labour, and the stimulus of lactation is absent. After abortion conception readily takes place before the uterus has returned to its normal size, and this favours a re-occurrence of abortion.

B. Causes which Operate through Production of Repeated or Protracted Congestion.

(1.) Displacements of the uterus;

(2.) Pressure of the distended rectum or bladder, or of tumours in or near the uterus;

(3.) Causes producing increased flow of blood to the uterus; as endometritis, too free use of caustics, and excessive sexual activity.

SYMPTOMS.

In the great proportion of cases, the patient *dates her suffering from a confinement;* frequently there is a history of repeated abortions. The patient finds, on rising after the puerperium, that she does not regain her former strength. There is weakness in the back, amounting in more severe cases to pain, a sensation of weight and bearing-down in the pelvis and of want of power in the limbs.

There is *leucorrhœa*, according to the extent to which the mucous membrane is affected.

Menstruation is irregular and often increased in frequency and quantity, though this is more characteristic of endometritis.

The *reproductive function* is variously affected. Before the structure of the uterus has become permanently altered, pregnancy followed by early *abortion* may repeatedly happen. The cause of the abortion is probably the alteration which is taking place in the structure of the mucous membrane and muscular tissue, rendering it unfitted for the development of the placenta; after an abortion, the conditions are peculiarly favourable for a second conception, even before the uterus has had time to undergo involution; an excessive development of connective tissue gradually renders the uterus incapable of involution, and thus the condition of subinvolution is perpetuated. Should the pregnancy go on to full time, the presence of an undue proportion of connective tissue in the uterine wall leads in the third stage of labour to atony of the uterus and retention of the placenta; see an interesting case of this reported by Kaschkaroff,[1] who gives the result of his microscopic investigation. After the condition has existed for some time, there is *sterility*. This is due not so much to the

[1] Centralblatt für Gynäkologie, No. 5, 1879.

changes in the uterus itself, though the leucorrhœa may prevent fertilisation, but to the ovaritis or pelvic peritonitis which is usually superadded; ovulation may be prevented by change in the structure of the ovary or by its being bound down by adhesions; the Fallopian tubes may be obstructed by cicatricial contractions.

The general constitutional derangements are very important, and it is on account of these that the patient usually seeks advice. Chronic metritis is the most important of all the diseases of women; the suffering of the patient in cases of displacement of the uterus is not due so much directly to the displacement as to the chronic inflammation secondary to it.

PHYSICAL SIGNS, DIAGNOSIS.

The uterus is *equally* enlarged; there is no alteration in its form. The character of the enlargement is best understood by contrasting it with that due to pregnancy. In the second or third month of pregnancy, there is antero-posterior broadening of the uterus; the vaginal finger comes on the anterior wall springing out from the cervix; the abdominal hand feels the rounding out of the fundus, combined with a softness which prevents us from distinctly defining its outline. In chronic metritis the vaginal finger does not feel any bulging of the anterior wall, and the abdominal hand recognises the fundus to be uniformly thickened; the outline of the latter may be felt with unusual distinctness through the greater firmness of the uterine tissue.

The enlarged uterus may be in its normal position, and freely movable or fixed by adhesions; it is often retroflexed.

The sound passes more than the 2½ inches; it passes *readily*, and is felt to be freely movable in the roomy uterine cavity.

DIFFERENTIAL DIAGNOSIS.

The conditions which are most liable to be confounded with chronic metritis are *early pregnancy* and *small fibroid tumours*.

In a case of early pregnancy, the "having passed a period" will put us on our guard; some patients, however, menstruate after conception. Discolouration of the vagina points to pregnancy, but is often not marked. The softening of the cervix is a more reliable sign, less reliable should pregnancy occur in a uterus which has undergone changes of chronic metritis. Our only guide is the bimanual examination, which

shows us the change in the form and consistence described above. When the abdominal muscles are resistent, the finger can recognize per rectum the bulging and softness of the posterior uterine wall. The interesting question suggests itself in this connection, how soon it is possible to recognise the changes in the uterus peculiar to pregnancy. *How soon can we diagnose pregnancy?* Before auscultation was known the first reliable signs were fœtal movements; the date at which the mother first recognised these varied indefinitely. Auscultation gave us an earlier and more reliable indication in the sounds of the fœtal heart; these cannot be heard before the fourth month. The bimanual examination enables us to detect pregnancy from the eighth to the tenth week. We have under very favourable circumstances diagnosed it at the fifth week, and the subsequent history has confirmed our diagnosis.

For the differential diagnosis of chronic metritis from small fibroid tumours, we refer the student to the "Diagnosis of small fibroid tumours" (Chap. XXXIV.).

TREATMENT.

Our first object is to diminish the passive congestion of the pelvic organs. The patient should be instructed to lie down for a few hours every day. Sedentary occupations or those that require the patient to stand for a long time in one position should be avoided. While enjoining a certain amount of rest, we must remember that rest becomes injurious when it interferes with nutrition. A certain amount of exercise, especially in the open air, should be as emphatically prescribed as a certain amount of rest.

Passive congestion is also diminished by giving local support to the uterus by a Hodge pessary; where the vagina is roomy, a soft ring pessary sometimes answers better.

The pelvic circulation is stimulated by vaginal injections; tepid water will generally be found to be the most available; cold water is a more effectual stimulus, but few patients can stand it. The vaginal injection should be employed just before going to bed; the douche is preferable to Higginson's syringe (*v.* p. 146). The injection should be continued from ten minutes to a quarter of an hour. It is a decided advantage to have the douche given with the patient in the *dorsal posture*, as Gallard recommends. Occasional warm baths are useful in some cases; when the patient is in the bath, the vaginal douche can be used at the same time

with greater freedom and effect. A cold hip-bath every morning is the best stimulus to the circulation. *Medicinal baths* have a peculiarly beneficial effect in chronic metritis. Amongst those the first place has always been held by Kreuznach, the waters of which are specially rich in bromides and iodides. The baths at Kissingen are rich in carbonates, and are of a lower temperature than those at Wiesbaden and Baden-Baden, which contain a smaller proportion of salts.

Further, the *drinking* of medicinal waters is also beneficial. The mineral springs at Ems and Vichy have, from their action upon the mucous membrane, always had a great reputation for the treatment of chronic uterine inflammation. Where there is much catarrh, they are specially serviceable. In scrofulous and chlorotic individuals, the advantage of waters which are rich in salts of iron is evident. Comparatively few of our patients, however, will be able to enjoy the luxury of a course of treatment at one of these watering places; but much benefit will be derived from change of air to the sea-side, or to the regular régime and cheerful surroundings of a hydropathic.

Attention to the action of the bowels is all important. Accumulations in the rectum and sigmoid flexure of the colon favor passive congestion, and interfere with the appetite and digestion. The mineral waters—Friedrichshall, Carlsbad, and Hunyadi Janos—are the best aperients.

The Carlsbad salts are specially useful in bilious patients; a teaspoonful should be dissolved in a tumblerful of water and drunk in repeated sips during the morning. Friedrichshall and Hunyadi Janos waters act best mixed with an equal amount of hot water; their dose varies from a wineglassful to a tumblerful. A good substitute for these waters is the tonic and aperient prescription given on page 198.

The iodide and bromide of potassium are given internally, as recommended at page 196.

Great care, and in some cases complete rest, should be enjoined at the menstrual period. As exacerbations usually occur at these times, a great deal is done towards a cure by prophylactic measures in regard to this.

Of local treatment the most important is *counter-irritation* by occasional blistering or repeated application of iodine or of croton oil to the iliac regions. French gynecologists recommend the application of the blistering fluid to the cervix; we have had no experience of this method. Thomas speaks highly of it, and practises it in the following way. A

large cylindrical speculum is passed, and the cervix cleansed and dried with a pledget of cotton. The preparation of vesicating collodion, made with acetic acid, is painted in two or three coats over the whole of the vaginal portion; after it has dried, a stream of cold water is applied to wash off any superfluous collodion. In eight to twelve hours there is a free discharge of serum. The patient remains quiet for some days, and uses occasional warm water injections; a pledget of cotton wadding soaked in glycerine is applied afterwards. Many gynecologists apply iodine to the cervix and roof of the vagina; Scanzoni recommended a solution of 4 gr. of iodide of potassium in 30 min. of glycerine. The simple tincture of iodine, or a solution of equal parts of iodine and glycerine, may also be applied in this way. *Local depletion* by scarification or leeches, as described under endometritis, is less frequently employed than formerly.

In speaking of Emmet's operation, we mentioned that it was sometimes followed by diminution in the size of the uterus. Carl Braun [1] has shown that after *amputation of the cervix* for hypertrophy the uterus sometimes undergoes changes which resemble those which occur physiologically in the puerperal uterus. Martin of Berlin strongly recommends the amputation of the posterior lip; in a paper read before the German Scientific Association at Cassel, he gives the results of the operation in 72 cases, in all of which the uterus was stimulated to undergo subinvolution.

Dr. Weir Mitchell [2] has introduced a method of treatment of chronic uterine disease which consists of *complete rest associated with a fattening diet and massage of the body generally.* The patient is isolated from her friends and subjected to the following régime for a period varying from one to three months. Milk, nutritious soups, eggs, cod-liver oil and other fattening foods are given by an attendant every few hours. All voluntary motion is forbidden. Friction of the skin, massage of the muscles of the body generally, and passive movements of the limbs are made by the attendant as often and as long as the condition of the patient will allow; this stimulates the circulation and favours absorption of nourishment with a minimum expenditure of strength.

Uterine massage. Massage of the uterus itself as a means of treating

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[1] Zeitschr. d. Ges. d. Wiener Aerzte, 1864, s. 43.

[2] Fat and Blood and How to Make them.

chronic metritis was introduced by Brandt [1] of Stockholm. The difficulty of carrying it out has prevented its being as yet extensively tried, but it has been followed with such good results in certain cases that it promises to become a recognised mode of treatment. Reeves Jackson,[2] who has found it successful in certain cases, rightly draws attention to the fact that it will not be effective when "the stage of induration has been reached." In performing massage, we begin by manipulating the skin of the abdomen; after the patient has got accustomed to this, we knead the uterus through the abdominal walls: if the uterus is so large that it reaches above the brim, this "abdominal massage" may be efficient; if it be smaller, two fingers are passed into the vagina to counteract the abdominal hand.

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[1] Nouvelle Méthode gymnastique et magnétique pour le traitement des maladies des organes du bassin et principalement uterinés: Stockholm, 1868.

[2] Uterine Massage as a means of Treating certain Forms of Enlargement of the Womb: Am. Gyn. Trans., 1880.

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CHAPTER XXXI.

DISPLACEMENTS OF THE UTERUS: ANTEFLEXION; ANTEVERSION; RETROVERSION; RETROFLEXION.

Literature.

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As the uterus is a movable organ within the pelvis, it is subject to various changes of *position;* as it is composed of a soft pliable tissue, it is liable to alterations of its normal *curvature.* Both of these changes are described in English text-books as "displacements," although, strictly speaking, this term should be applied only to the former.

The normal form, position, and relations of the uterus have been already described (see Vol. I., Chap. II.).

The uterus is constantly exposed to forces producing a temporary displacement. In front there is the *bladder*, the dilatation of which displaces the uterus backwards and somewhat upwards (Fig. 44). Behind there is the *rectum*, which normally should have little influence on the position of the uterus; but, owing to inattention to its regular evacuation, it is frequently over-distended and thus acts as a displacing cause operating from above and behind. Above there is the *abdominal pressure*, which is con-

stantly acting on the uterus especially during inspiration. One has only to watch the movements of the anterior vaginal wall during respiration to see that this factor is always operating. Its action is of course increased by whatever increases the intra-abdominal pressure, that is, by any straining efforts which bring the abdominal muscles into play. Below there is the *pelvic floor*, which has a constant action in supporting the uterus against the abdominal pressure.

We must distinguish between *physiological* and *pathological* displacements. The former is transient, and passes away when the cause has ceased to operate; the latter is persistent, and produces permanent alterations in form, position, and structure. It is difficult to draw the line between those two. The pathological condition is frequently due to simple over-stepping of the limits of the physiological. Thus the carrying of the uterus backwards into a retroverted position by the distention of the bladder is physiological, while its remaining permanently in that position is pathological.

It is evident that the uterus can be displaced in at least three ways: *first*, the different parts of it may alter their position relative to one another; *second*, it may rotate round the transverse axis; *third*, the organ may be displaced as a whole. Any great rotation round the vertical axis is prevented by the attachments of the uterus.

1. Alteration in the relative position of body and cervix constitutes *flexion* of the uterus, in which there is a change in the curvature of the long axis, *i.e.*, in the direction of the uterine canal.

2. Rotation of the organ round an imaginary transverse axis constitutes *version* of the uterus.

3. Displacement of the organ as a whole, although frequently observed, has not been described in English works by a precise term. We might use the term *position* with the suitable prefix. Thus when the uterus lies "back as a whole" in the pelvis, it might be described as "a retroposition" or as "retroposed" (*Germ.*, retroponirt).

The uterus, in its normal condition, is anteflexed, anteverted, anteposed—placed as far forward as the bladder will allow.

Various deviations from the normal condition may occur.

(*a.*) There are three possible changes in *flexion*. To understand these, suppose the direction of the cervix to be fixed. The uterine axis may be (pathologically) *ante*flexed (Fig. 194 *a*), so that the normal curvature is increased; this is sometimes associated with retroposition. The axis may

become *straight*, as occurs in so-called anteversion (Fig. 194 *b*). It may also be *retro*flexed (Fig. 194 *c*); this condition occurs rarely by itself, but associated with retroversion it is a common displacement.

(*b.*) *Version* round a transverse axis is either forwards or backwards. An increase of the normal *ante*version (Fig. 195 *a*) is not frequent; the

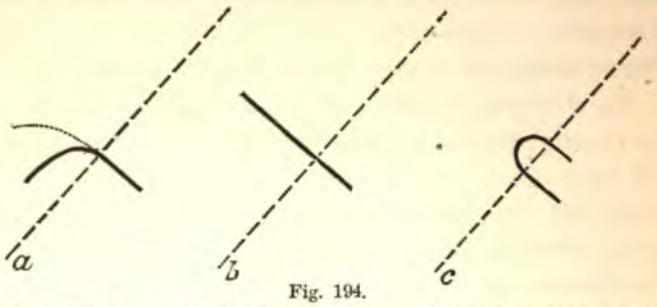

Fig. 194.

Diagrammatic scheme of flexions. The broken line represents plane of brim; the dark line the axis of uterus; the dotted line its normal curvature. For letters see text.

condition generally so described is more often the result of straightening of the uterine axis (Fig. 194 *b*). *Retro*version occurs alone (Fig. 195 *b*), and is further always present where there is retroflexion (Fig. 195 *c*). The body of the uterus may also be drawn to either side of the pelvis, the cervix being directed to the opposite side. This constitutes *lateri-version*. Normally, the uterus is slightly lateri-verted to the right.

(*c.*) Change in *position*, or displacement of the organ as a whole, is

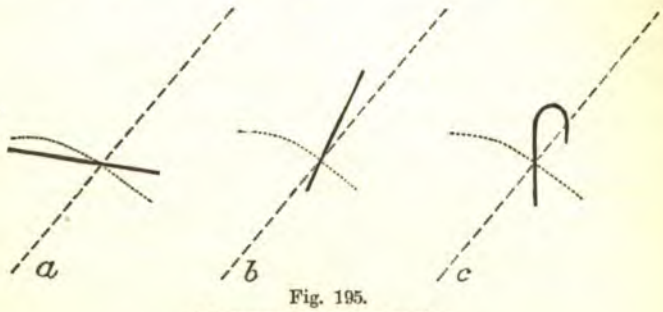

Fig. 195.

Diagrammatic scheme of versions.

upwards, downwards, backwards, or to either side. *Upward* displacement occurs in pregnancy or whenever there is a tumour present which lifts the uterus out of the pelvis; it is of little pathological significance. *Downward* displacement occurs in prolapsus uteri, and will be discussed under that head (Section VII. Affections of the Pelvic Floor). A change in posi-

tion *backwards* or to *either side* is produced by pressure or by traction; when produced by cicatricial contraction, these are the most important conditions we have to deal with.

We have considered, from a theoretical point of view, the variations in flexion and version in detail, to enable the student to understand clearly what these terms mean. Too much importance should not be attached to slight variations; the student need only note the following points.

1. The normal curvature may be exaggerated—anteflexion.

2. The uterus may be straightened, the normal angle becoming less pronounced and thus throwing the cervix more backwards—anteversion.

3. The uterus may be directed backwards—retroversion.

4. It may not only be turned backwards but the normal angle may be reversed, the fundus being bent backwards instead of forwards—retroversion + retroflexion.

5. The uterus may be displaced as a whole, usually by cicatricial contraction. This last condition is the most difficult to treat.

The *etiology* of flexions and versions is a subject on which little definite is as yet known. This is the more unfortunate as a knowledge of etiology is of first importance in rational treatment. We should recommend the student to inquire carefully into the origin and duration of the symptoms; and on making his physical examination not to be content with ascertaining merely that there is a displacement, but to find out if possible the cause. This will guide him both in prognosis and treatment; it will indicate what cases he may hope to cure, and what cases he should leave alone. A knowledge of etiology enables him to prevent the occurrence of displacements, as, for example, of retroversion in the puerperal condition; and in this case prevention is better than cure.

The *symptoms* of these displacements have given rise to much discussion, some maintaining that they produce no symptoms at all. We are sometimes surprised on examining a patient to find a well-marked flexion which had not made its presence felt by any symptoms. This is however the exception; as a rule, displacements are followed by a well-marked train of symptoms from which a provisional diagnosis may be made. This apparent contradiction is to be explained by the fact that flexions and versions, in themselves, give rise to no symptoms primarily. The symptoms arise *secondarily*, and are due (1) to interference with the functions of menstruation, conception, and pregnancy; (2) to chronic metritis and endometritis which is produced by the displacement; (3) to pelvic

cellulitis and peritonitis, which frequently accompany the displacement and are sometimes the cause of it.

As regards the *physical examination*, it is evident that the position and direction of the cervix is not a guide to the position of the fundus. If we had simply to do with versions, we might compare the uterus to a lever of which the body would be the long and the cervix the short arm ; and the direction of the short would indicate the position of the long arm. But the possibility of flexion introduces a joint on the lever, so that the direction of the short is no guide to the direction of the long arm. We cannot, from a simple vaginal examination of the cervix, infer the position of the fundus, which is the point to be ascertained. A careful bimanual examination, supplemented if necessary by the use of the sound, is essential for a diagnosis.

As regards *treatment* the student should recognise how many lesions are present, and whether they are causes or results ; a frequent chain is that a cellulitis produces a displacement which is followed by metritis, endometritis, and ovaritis. In most cases there is more than one pathological condition present, and these must be treated in order. We first *check existing inflammation* by hot water injections, blistering, rest, and the use of the glycerine plug. Ergot is given when menstruation is increased. When the absence of tenderness on examination has shown that inflammation is checked, we then—but not till then—think of treating the displacement. The time chosen should be between two menstrual periods. In backward displacement, we bring the uterus to its normal position and retain it there. In forward displacements, usually we dilate or straighten the uterine canal and in some rare cases support the uterus. The *after-treatment requires more attention than the immediate correction of the displacement*, and months of careful watching are necessary. Thus, the keeping of the uterus in its place by a carefully adapted pessary is more important than the replacement; the keeping of the uterine canal open after Sims' operation is more important than the operation itself.

ANTEFLEXION.

PATHOLOGY.

Anteflexion, as has before been stated, is merely an exaggeration of the normal condition. As to its frequency, there is great difference of opinion. The reason of this diversity is that a degree of flexion which

would be called pathological by one observer would still be called physiological by another. The question of symptoms does not help us in deciding this; because, on the one hand, we sometimes find an amount of flexion which is decidedly pathological although the patient does not complain of any special symptoms; on the other hand, the characteristic symptoms may exist but be due to a different cause. *Anteflexion is more common in nulliparæ* just as retroflexion is more frequent in multiparæ, the reason being that anteflexion is a frequent cause of nulliparity.

The usual *seat of the flexion* is at the upper portion of the cervix, or at its junction with the body. Flexion of the body itself is rare. Some-

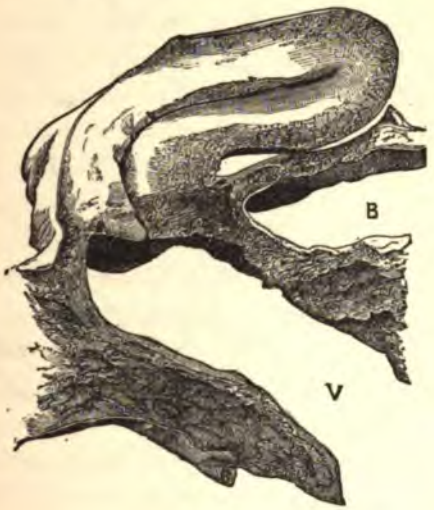

Fig. 196.

Anteflexion with stenosis at os externum. *V*, vagina, *B*, bladder, *p*, peritoneum of pouch of Douglas (Winckel).

times the cervix is bent sharply forwards, so that it lies in the axis of the vagina and forms a distinct right angle with the body which is approximately in its normal position (see Fig. 196). In other cases, the uterus is sharply curved on itself (see Figs. 40 and 197). This last condition is sometimes mistaken for retroversion, because the finger feels through the posterior fornix the supra-vaginal portion curving backwards and the position of the fundus is not ascertained till the bimanual examination is made. In such cases the examination with one finger in the rectum is useful, as we can thus get above the point of flexion and feel that the fundus turns forwards.

The vaginal portion is frequently small and the os reduced to a pin hole (congenital cases); sometimes it is high up and difficult to reach, being drawn upwards and backwards by cicatricial bands. As regards the microscopic changes in the tissue, we are still in want of information.

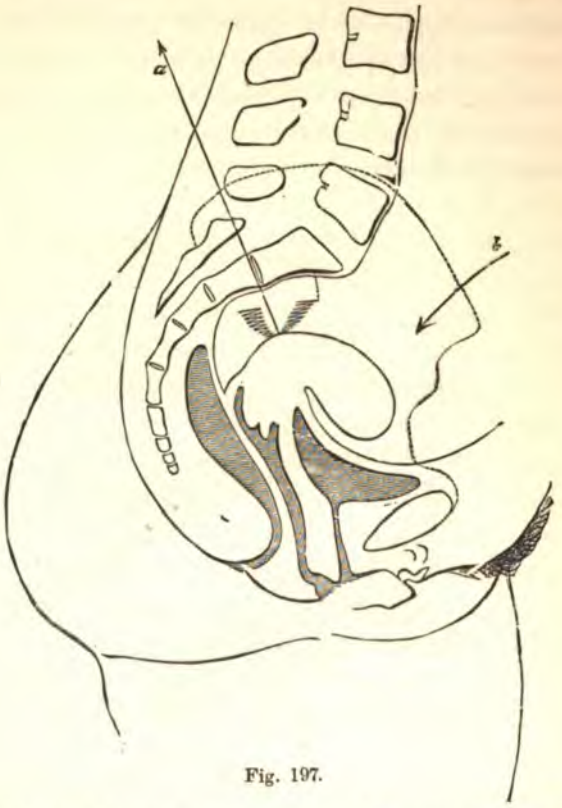

Fig. 197.

Diagram to show anteflexion produced by cicatrization of utero-sacral ligaments (Schultze).

Virchow found no fatty degeneration of muscular fibre at the angle of flexion; the tissue was anæmic at this point but congested elsewhere. According to Rokitansky, the connective tissue framework of the uterus is thinnest at the os internum; hence the liability to flexion at this point.

ETIOLOGY.

Etiologically we distinguish two kinds of anteflexion, the congenital and the acquired.

In cases in which the anteflexion is *congenital*, the whole uterus is im-

perfectly developed, the cervix is small and the pin-hole os looks downwards and forwards. Fritsch gives an ingenious explanation of how the flexion is produced in such cases. The uterus of the new-born child has thin walls and is flexible ; the intra-abdominal pressure acts on the posterior surface of the fundus and produces anteflexion ; this action is counteracted by the bladder on which the uterus is, as it were, moulded ; when the uterus remains small and thin walled, it does not offer such a large surface to the bladder so as to be raised by it and have its flexion undone. Accordingly, a pathological degree of anteflexion is produced. The same writer would also refer some cases to congenital shortening of the utero-sacral ligaments.

As regards *acquired* anteflexion, it is undoubtedly often the result of inflammatory changes behind the uterus. In many cases of anteflexion, we observe that the cervix is higher than its normal position and far back in the pelvis ; and that the attempt to bring it to its normal position produces pain. The cause of this condition was first brought into notice by Schultze,[1] who ascribes it to a cellulitis in the utero-sacral ligaments. This produces cicatricial contraction so that the cervix is drawn upwards and backwards, and the fundus thrown more forwards. Schroeder, however, holds that the retraction of the cervix is produced by adhesions resulting from peritonitis. We draw attention specially to this cause of anteflexion, because it can be distinctly made out by careful examination. When it has been made out it is a contra-indication to hasty operative interference, and the prognosis as to cure is unfavourable.

Graily Hewitt refers this, as all other flexions, to the condition of the uterine tissue.

It is evident that a fibroma, or other tumour increasing the weight of the fundus, will favour anteflexion if the fundus be directed forwards. In the commencing enlargement of pregnancy, the fundus droops more forwards or is at least more distinctly felt in the anterior fornix.

Unequal growth of the uterine walls has been given as the cause of congenital flexions, and unequal involution of the walls as the cause of flexions acquired during the puerperium. This is merely an explanation of how it is produced ; the cause of this unequal growth requires, in turn, an explanation.

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[1] Loc. cit., S. 414.

SYMPTOMS.

The most important symptoms are—

Dysmenorrhœa,

Sterility.

In addition to these there are sometimes present—

Leucorrhœa,

Menorrhagia.

Frequently there are the ordinary symptoms of pelvic inflammation.

In some cases we find a well-marked anteflexion giving rise to no symptoms which patients complain of, as they are not accustomed to speak of sterility as a symptom; but dysmenorrhœa is generally present, and is the symptom which leads the patient to seek advice.

Dysmenorrhœa. By this we understand that menstruation is accompanied with pain. The form of dysmenorrhœa present in anteflexion is called "uterine," in contradistinction to "ovarian" (see Dysmenorrhœa, Section VIII.). By "uterine dysmenorrhœa," we understand that the pain is not marked until the menstrual flow has appeared and that it continues as long as the discharge continues. The pain is felt in the small of the back and sometimes in the pelvis generally, but is not localised in one ovarian region. In typical cases, the pain resembles labour pains and the menstrual blood is clotted.

Two different explanations of this pain have been given, and these have an important bearing on treatment. For convenience, we describe these as the obstruction and the congestion theories.

1. The *obstruction* or *mechanical theory* is the one most generally accepted, and furnishes the rationale of the operative modes of treatment introduced by Sir J. Y. Simpson and Marion Sims. According to this explanation, the flexion of the uterus produces a narrowing of the uterine canal at the point of flexion. Hence, when the menstrual blood is poured out into the cavity of the uterus, it finds an obstacle to its free exit. There is consequent retention and coagulation, and the coagula stimulate the uterus to muscular contractions to effect their expulsion. The mechanical resistance to the outflow of blood and the uterine contractions excited to overcome this, are the cause of the pain. The condition is comparable to that in stricture of the male urethra. The blood, like the urine, is secreted but cannot be passed without pain; there is dilatation with sometimes secondary hypertrophy of the uterus in the former case,

as of the bladder in the latter. It may fairly be objected to this mechanical explanation that the discharge is not always clotted, that in some cases it is very small in quantity, that it is doubtful whether the small blood clots excite painful contractions, and that in many cases the pains complained of have not the distinctive character of labour pains. On the other hand, if this theory be not the true one, it is difficult to explain the great benefit derived from various modes of treatment based on it to be presently described.

2. The *congestion theory* is clearly stated and advocated by Fritsch.[1] According to this gynecologist, the dysmenorrhœa is not due directly to the bend on the canal. The pain arises from the resistance which the muscular tissue of the uterus offers to the hyperæmia. In normal cases, this tissue yields to the distending vessels ; but, when the uterus is small or bent on itself, there is an obstruction offered to the flow of blood. The mucous membrane cannot swell up as it does normally. Thus there is undue vascular tension and compression of the nerve-endings in the uterus. This last causes the pain.

Whether this explanation harmonises better with the facts it is difficult to say ; but we should suggest a modification of Fritsch's views, which the student might combine with the purely mechanical theory. The flushing of any diseased tissue with blood causes an aggravation of pain, which is increased if the tissue be of a dense structure. The cause of the intense pain in periostitis as the affected limb becomes warm in bed, is thus explained. Now the tissues of the uterus are frequently in a state of chronic inflammation, and there is sometimes increase of connective tissue making it of a less yielding structure ; this occurs in retroflexion complicated with subinvolution. The monthly flushing of the pelvis with blood would, under these circumstances, be accompanied with pain. We must also remember that cellulitis and peritonitis are often present with anteflexion ; and increase of pelvic congestion will, of course, produce increase of pain.

Sterility is frequently associated with anteflexion ; the patient is not so likely to refer to it, as the dysmenorrhœa is the more pressing symptom and that for which she seeks advice. This symptom has been referred to the obstruction in the uterine canal ; as the menstrual blood is prevented from passing downwards, so the spermatozoa are prevented from passing

[1] Loc. cit., S. 35.

upwards. But it is evident that this mechanical explanation is insufficient, because no mere contraction could prevent the passage of microscopic spermatozoa; without doubt sterility is frequently the result of the binding down of the ovaries or the Fallopian tubes by concomitant inflammation. However we explain it, the clinical fact remains that by passing the sound or dividing the cervix we place the patient under more favourable conditions for conception.

Dyspareunia—pain on sexual intercourse—is occasionally an important symptom, though naturally the patient does not refer to it. In such cases we generally find that there is inflammatory action behind the cervix.

Leucorrhœa is generally present, more especially if the uterus be enlarged. It is not so important a symptom as it is in retroflexion.

Menorrhagia is sometimes present, when there is uterine enlargement or endometritis as the result of anteflexion.

PHYSICAL DIAGNOSIS.

On making the vaginal examination the cervix is felt to be high up, and lies in the axis of the vagina with the os looking downwards and forwards. It may be small and conical, with a pin-hole os (congenital, *v.* Fig. 147); or the anterior lip may be elongated, the end of the cervix being at the same time somewhat flattened against the posterior vaginal wall. The body of the uterus is felt in the anterior fornix continuous with the cervix with which it forms a distinct angle in which the tip of the finger may be placed. If the flexion be high up or the uterus drawn upwards, the body may not be felt on simple vaginal examination. Even if it be felt, we cannot be certain that it is the body of the uterus till the bimanual is made as follows. Endeavour to get the body felt in the anterior fornix fairly between the hands; by examining all round, make sure that what is grasped is the body of the uterus. Now place the index finger under the fundus in front of the angle and the middle finger against the cervix, and, making pressure with the external hand, ascertain to what extent the flexion yields. Examine carefully the posterior fornix to see if there are any bands drawing the cervix backwards; try whether bringing the cervix forcibly forwards causes pain, which would indicate an inflammatory condition in the utero-sacral ligaments or the presence of adhesions in the pouch of Douglas. We can ascertain this even better by passing the middle finger into the rectum, the index finger being in

the vagina, and at the same time making the bimanual examination. The finger in the rectum feels a pouch in the anterior rectal wall bounded by a tense band on each side (utero-sacral ligaments), or one or more cord-like adhesions (the result of former peritonitis), or a general resistance to pressure which produces pain. Any of these conditions indicate that the cause has been inflammation, which has produced cicatrisation behind the cervix.

Though the bimanual examination is in many cases sufficient, it may be supplemented by the use of the sound. This is necessary for differential diagnosis, and its frequent introduction constitutes one form of treatment. Curve the sound to correspond to the angle of flexion. It will be found to pass with comparative ease for about an inch or an inch and a half, and then it is stopped by the angle of flexion. To get it past this, press up the fundus through the anterior fornix with the finger in the vagina or draw down the uterus with the volsella. The sound shows that the length of the uterine cavity is sometimes diminished (congenitally small uterus), sometimes increased (the result of the obstruction to the outflow of menstrual blood). It may further show tenderness in the uterine cavity (endometritis). The use of the sound is undesirable where there is inflammation behind the uterus and, when the bimanual places the diagnosis beyond doubt, is unnecessary except for treatment.

DIFFERENTIAL DIAGNOSIS.

The only conditions which, after careful examination, might yet be mistaken for an anteflexion are—

Myoma in the anterior uterine wall,

Cellulitis between the cervix and the bladder.

A *myoma* is easily diagnosed by the sound. As in anteflexion, a body is felt in the anterior fornix; and we must ascertain whether this body is the fundus uteri. When the sound is passed into the uterus (Fig. 198) in a case of myoma, a finger in the anterior fornix does not feel the sound or feels that a body lies between it and the instrument. Now make the bimanual examination with the sound in the uterus; the position of the fundus is indicated by the external hand feeling the point of the sound.

The diagnosis from cellulitis is less easy, because through the tenderness it is difficult to ascertain whether the body felt in the anterior fornix

is the fundus uteri or a cellulitic deposit. A careful bimanual examination will, if if be a cellulitic deposit, show that the fundus uteri is lying in

Fig. 198.

Sound passed to show that a myoma of the anterior wall is not an anteflexion; the bladder is to the left (Leblond).

some other position. When active inflammation is present, the use of the sound is contra-indicated.

PROGNOSIS.

The prognosis should always be guarded in respect of the disappearance of symptoms. The most favourable cases as to a cure are those where the anteflexion is congenital, is situated low down, and where there is no pelvic inflammation.

TREATMENT.

Pelvic inflammation, if present, must first be treated. Where the uterus is displaced by cicatricial bands, the stretching of these by massage has been suggested and is certainly worthy of trial. With two fingers of the right hand in the posterior fornix behind the cervix and the external hand pressed deeply into the hollow of the sacrum so as to get behind the fundus uteri, we manipulate the uterus between the hands so as to bring it near the pubis and thus stretch the adhesions behind it. Massage is accompanied with free use of the vaginal douche. This process is repeated at weekly intervals, but is stopped if inflammation ensues.

A considerable number of cases are benefited by operative treatment; but we must select the cases on definite principles.

1. We should not operate if there be active inflammation present, as indicated by tenderness on pressure in the fornices. The presence of an

old cellulitic deposit or thickening of the pelvic peritoneum is not a contra-indication.

2. We should not operate if the whole uterus is congenitally small. The introduction of a uterine stem in such cases may simulate the uterus to increased growth; if dysmenorrhœa be present, the mere correcting of the flexion will not probably cure it; the sterility is probably due to some other effect of the arrested development. Such cases should be left alone. Nor should we operate when the menstrual flow is gradually diminishing in quantity.

To understand the *methods* of *operative treatment*, let us compare them with those of stricture of the male urethra. Here we have three modes of treatment: we may dilate the stricture by passing instruments of gradually increasing size; we may pass an instrument and leave it, thus producing vital dilatation; if both of these means fail, we may divide the stricture with the knife. For the treatment of anteflexion, we have three analogous

Fig. 199.

Solid intra-uterine stem made of copper.

methods: we pass the uterine sound occasionally, or pass uterine dilators of gradually increasing calibre; we introduce an intra-uterine stem, and leave it in; we divide the constricting portion of the canal at the os externum, and the knee-shaped bend at the point of flexion.

1. The occasional *introduction of the sound*, say twice a week between the menstrual periods, is sometimes followed by distinct relief of the symptoms. It has the advantage of being easily done, is seldom followed by injurious effects if done with ordinary care, and should always be tried in the first instance. Dr. Macintosh employed sounds (made of steel) of gradually increasing calibre to dilate the canal more effectually.

2. Where the flexion is not acute or resistant, the *intra-uterine stem* is useful. It serves both to straighten the canal and also to keep it open. The copper intra-uterine stem (see Fig. 199) introduced by Sir J. Y. Simpson, or one of similar form made of vulcanite which has the advantage being lighter, or the hollow gutta-percha one (see Fig. 200) recommended by Greenhalgh (which acts like a drainage-tube), may be used for

this purpose. In employing the rigid intra-uterine stem, we must see that the stem is a quarter of an inch shorter than the uterine canal, so that it may not press injuriously upon the fundus. Greenhalgh's stem is carried in on the ordinary uterine sound. For the method of introducing the rigid stem see page 264. The stem can be worn for months; it need not be removed during the menstrual period, but should be taken out when there is suspicion of pregnancy. Conception sometimes takes place with the stem *in situ*. Even the judicious use of stem pessaries is apt to be followed by mischief; they require, therefore, careful watching.

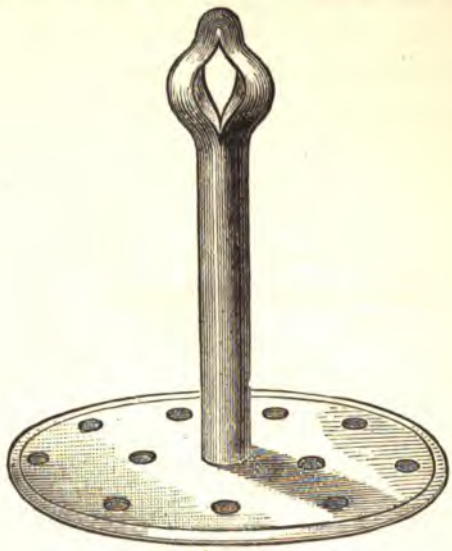

Fig. 200.

Greenhalgh's intra-uterine stem.

3. If both of these means of treatment fail, we have recourse to division of the cervix. In some cases, it is evident from the first that this is the proper mode of treatment; it is often followed by brilliant results. There are two distinct modes of procedure, each adapted to a particular class of cases. There is (1) the bilateral division of the cervix introduced by Sir J. Y. Simpson; and (2) the antero-posterior section of the posterior lip with division of the mucous membrane of the anterior wall of the cervix at the seat of flexion, introduced by Marion Sims.[1]

(1.) When there is a small pin-hole os and the flexion not pronounced

[1] For fuller details, see his paper: On the Surgical Treatment of Stenosis of the Cervix Uteri: Am. Gyn. Trans., 1878.

(the symptoms being due to the narrow os externum), or when sterility rather than dysmenorrhœa is the leading symptom, the indication is for Simpson's operation. This has been already fully described under stenosis of the cervix (Chap. XXIV.).

(2.) Marion Sims recommends that his operation be performed in cases where there is well-marked flexion, and the intra-vaginal portion unequally developed, *i.e.*, where the posterior lip is elongated so that the os looks downwards and forwards. The intention of the operation is to correct the flexion of the canal by making the exit at the base of the posterior lip of the cervix instead of at its apex, that is, at the outer end of the dotted line *a* (Fig. 201). But as the flexion is too high up to be reached by this incision alone, it is necessary for the more complete

Fig. 201.

Sims' division of cervix; *a*, incision in posterior lip, *b*, incision at knee of flexion (Marion Sims).

straightening of the canal that the tissue of the knee-shaped bend in the anterior wall be partially divided—the incision to be made to the depth of the line *b* (Fig. 201).

This operation should not be performed indiscriminately in all cases of uterine dysmenorrhœa, but only after we have ascertained by careful examination that the flexion is sufficient to account for the dysmenorrhœa and that the latter is due to nothing else. The patient should be informed that sometimes the symptoms return afterwards; this is due to the partial closing up of the incision, which may occur in spite of the greatest precautions. When pelvic inflammation is present, we should not operate. If the cervix is drawn backwards and fixed, we are not likely to have a good result.

The operation is performed as follows. The speculum having been

passed, the cervix is drawn down with the volsella to the vaginal orifice. Marion Sims divides the posterior lip with his utero-tome. A pair of strong scissors does equally well. Kuchenmeister's scissors have the point of one blade turned in like a hook; this blade is placed externally in making the section, and the pointed hook keeps the scissors from slipping. The scissors in Fig. 111, Vol. I., have this peculiarity; and the form of the handles, with their greater length in proportion to that of the blades, gives the hand better purchase and enables the operator to cut steadily through the dense tissue of the cervix. The instrument is passed, with the straight blade in the cervical canal, till the incurved point of the external blade is opposite the line of reflexion of the mucous membrane on the posterior wall of the vaginal portion. The handles are now approximated, the ratchets on them enabling us to do this slowly and steadily. When they are brought together, the instrument is withdrawn. The finger is passed into the cut to see if it is of sufficient depth; if any projecting band of tissue be felt, it is divided with the knife. The mucous membrane of the anterior wall of the cervix at the seat of flexure is now divided as follows:—A curved tenotomy-knife, with a narrow probe-pointed blade, is passed into the canal; the sharp edge is turned forwards, but the back of the knife is pressed against the posterior wall so that the knife does not cut on being passed in; having passed it fairly to the point of flexion, we now withdraw it and at the same time press the blade forwards. We judge as to the extent of this incision from the amount of flexion present (ascertained by previous examination) and from the sensation of the hand in cutting through the tissue.

After-treatment.—The incision must be kept open by the introduction of a glass plug (Fig. 157, Vol. I.). Unless this be done, the result is only temporary; we speak from experience, having operated in several cases without the introduction of a plug subsequently. The patient in these cases derived great benefit for two or three menstrual periods, but after this the symptoms returned; and it was found, on examination, that the new opening had been obliterated by cicatrization.

The treatment of anteflexion by specially adapted vaginal pessaries is recommended by Thomas and others, but is not a scientific one. It is wrong in principle, because the fundus uteri cannot be propped up by an arm of the pessary projecting through the anterior fornix so as to diminish the angle of flexion. In some cases where the uterus is large and heavy we find that benefit is derived from supporting the uterus as a

whole. But this is best effected by an ordinary vaginal pessary (Hodge or Albert Smith), and is not a mode of treatment specially of anteflexion. We shall refer to this again under the treatment of anteversion.

ANTEVERSION.

PATHOLOGY AND ETIOLOGY.

The *pathological change* consists in a straightening of the uterine axis, so that the normal angle of forward curvature is diminished and the cervix passes more directly backwards. The uterus is usually enlarged and its texture is firmer. In this condition it is movable or fixed. If the former, its position varies with the distention of the bladder; if the latter, the fixed uterus will press more or less on the bladder as it distends, and thus produce one of the symptoms of anteversion.

According to Fritsch, the fixation of the uterus is never to the pubis; this is because the bladder, lying between the fundus and the symphysis, prevents adhesions from forming. On post-mortem examination of a case in which he had diagnosed anteversion with fixation, he found that the fundus was bound down at its left angle.

The microscopic changes have not been described, but we should expect an increase in the amount of connective tissue (*v.* Chronic Metritis).

ETIOLOGY.

As anteversion is *the form and position taken up by the uterus when it is enlarged through chronic metritis*, the *causes* which produce anteversion are those which produce chronic metritis—subinvolution, laceration of the cervix, and other causes of pelvic inflammation (*v.* Chronic Metritis).

This position also occurs physiologically in early pregnancy; probably because the increased weight of the uterus causes it to fall more forwards.

SYMPTOMS.

There are no symptoms characteristic of anteversion, *per se*, but we generally find present, in the first place, the local symptoms of chronic uterine and pelvic inflammation.

Thomas draws attention specially to loss of power in walking—when the version was treated, power was restored; this was probably a reflex

phenomenon. Sometimes there are symptoms due to interference with the functions of the bladder and the rectum. Pressure of the fundus (when the uterus is *fixed*) on the bladder produces frequent calls to micturition; pressure of the cervix on the posterior wall of the vagina produces erosion and catarrh, and on the anterior wall of the rectum produces painful defecation.

Further we may have the train of general symptoms which follow on any long-standing disturbance of the reproductive system, viz., derangements of the digestive and nervous systems. Schoerder draws attention to the fact that discomfort is often produced when the uterus is enlarged but freely movable, and that this is due to the heavy organ's becoming displaced on the movements of the patient; further, that it is relieved if the uterus be fixed by a vaginal ring pessary.

DIAGNOSIS.

There is usually no difficulty in diagnosis. The finger in the vagina feels the cervix passing directly backwards, the os looking towards the hollow of the sacrum. The body of the uterus is distinctly felt through the anterior fornix; and on tracing it back to its junction with the cervix we do not feel the normal forward curvature. The whole organ is usually enlarged and firm in texture. From the distinctness with which the uterus is felt when the bladder is empty, we might infer that only the anterior vaginal wall lay between it and the finger. But, if we make the examination when the bladder is partially distended, or if we pass the sound into the empty bladder, we find that the bladder passes backwards almost as far as the cervix uteri. Perhaps the bladder symptoms, which are present in marked cases, might be explained through the traction thus made on the bladder and its abnormal position; these interfere with its dilatation.

The bimanual examination shows that the body felt in the anterior fornix is the fundus uteri. The student should not, however, be content with this knowledge, but should examine carefully the size and mobility of the uterus; and, when it is fixed, should ascertain the cause of this.

The introduction of the sound is difficult on account of the high position of the os, and its use is unnecessary except in cases of doubt as to whether the body felt anteriorly is the fundus uteri.

The only case in which there is difficulty in differential diagnosis is

when there has been inflammatory deposit in front of and around the cervix, simulating the anteverted fundus. In these cases the combined examination is difficult from existing inflammation. The examination with one finger in the rectum enables us, in such cases, to ascertain that the fundus uteri is at least not lying to the back.

TREATMENT.

From what we have said in regard to the symptoms, it follows that the treatment, in the first instance, is that of endometritis, metritis, cellulitis, or peritonitis, according to the condition which is present. As regards the supporting of the uterus, great benefit may be derived from the glycerine plug, which in this case should be well packed into the posterior fornix. The simple vaginal pessary (Hodge, Albert Smith, ring) is useful in supporting the uterus as a whole, and in fixing the cervix.

As already said under anteflexion, the fundus cannot be immediately

Fig. 202.

Grally Hewitt's cradle pessary. *a* is in posterior fornix; *b* at vaginal orifice; *c* in anterior fornix (Barnes).

supported through the anterior vaginal wall. Various forms of pessary have been devised, but the principle is the same in all. There is the "cradle pessary" of Grally Hewitt (Fig. 202), made of vulcanite. Mundé strongly recommends Gehrung's anteversion pessary (Fig. 203). Its position in the vagina is seen at Fig. 204. Thomas has devised several forms of anteversion pessary, of which one is represented at Fig. 205. It is simply a Hodge pessary, with a projecting bar which passes into the anterior fornix and tilts the cervix forwards and thus slightly retroverts the fundus. To facilitate its introduction the bar moves on a hinge so that it may be brought parallel with the pessary as it is passed in, while a con-

cealed india-rubber spring brings it into place when it is within the vagina. The patient requires careful watching after its introduction, as it

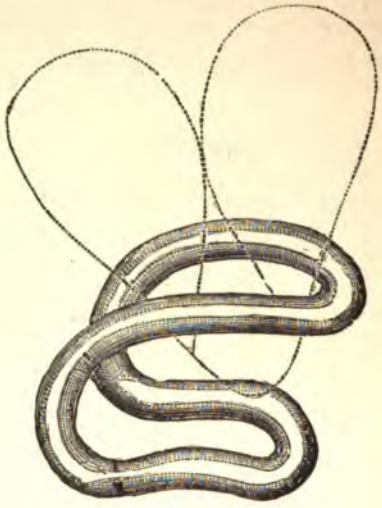

Fig. 203.

Gehrung's anteversion pessary *in situ* (Gehrung).

is liable to set up pelvic inflammation. Several cases are recorded by Thomas of benefit derived from wearing such a pessary.

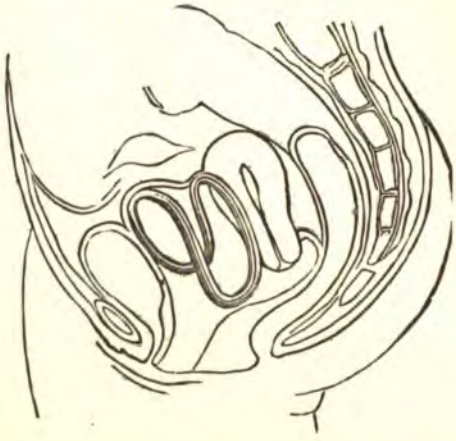

Fig. 204.

Gehrung's anteversion pessary as placed by Mundé. The pessary is figured relatively too large (Mundé).

We have described anteversion as one of the displacements of the uterus. The student should note, however. that anteversion is in itself

not a lesion but one of the "physical signs" of metritis, chronic pelvic peritonitis or pregnancy. It is improbable that the mere anteversion of the uterus causes any distress. The ordinary statement that the uterus when anteverted presses on the bladder, is open to the fatal criticism that the uterus always presses on the bladder; while, so far as mere weight is

Fig. 205.

Thomas' anteversion pessary.

concerned, there are, in the majority of cases, no special symptoms referable to the anteversion of early pregnancy. Any enthusiastic believer in anteversion pessaries is bound to insert them in all cases of early pregnancy. Probably, in a few years, anteversion will cease to be considered among uterine displacements.

RETROVERSION.

PATHOLOGY AND ETIOLOGY.

Physiological retroversion occurs whenever the bladder is fully distended (*v.* Fig. 44, Vol. I.). This is distinguished from the pathological condition by the fact that it is transient, and ceases when the bladder is emptied.

Pathological retroversion is found under the following conditions:

1. During the first days of the puerperium the uterus lies retroverted, or at least retroposed. The weight of the uterus and the laxity of its attachments makes it occupy this position when the patient is recumbent.

2. It is produced by the mechanism of prolapsus uteri (*v.* Section VII.). The axis of the uterus changes its direction as the organ descends.

3. It is also of importance as a stage in the production of retroflexion, which is the most frequent and important displacement which calls for treatment. The uterus becomes retroverted, and then acquires a backward flexion.

4. Chronic peritonitis producing obliteration of the pouch of Douglas, or cicatricial bands which drag the uterus backwards, will produce a permanent retroversion—as is beautifully shown in the accompanying preparation from Winckel's Atlas (Fig. 206).

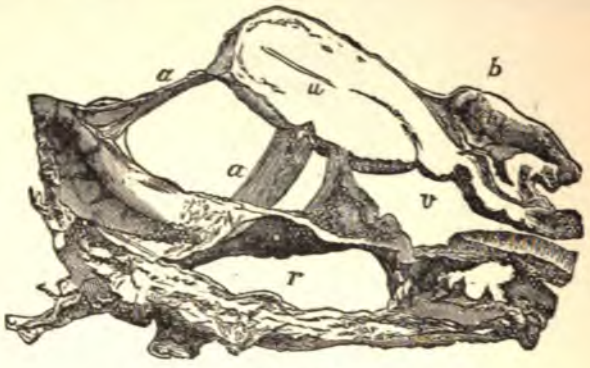

Fig. 206.

Uterus retroverted and bound back by peritonic adhesions (Winckel). *a*, *a*, adhesions; *b*, bladder; *v*, vagina; *u*, uterus; *r*, rectum (½).

The chief *causes* of retroversion are:

1. A sudden straining effort or a violent blow;
2. Non-return of the uterus to its normal form and position during the puerperium;
3. Inflammatory action behind the uterus, producing adhesions or cicatricial bands.

SYMPTOMS.

The symptoms of retroversion are the same as those found in retroflexion, to be presently described. When it arises during the puerperium, a late flooding—two to three weeks after labour—is sometimes a prominent symptom; or there is a daily loss of blood in small quantities whenever the patient rises and goes about (Fritsch).

DIAGNOSIS.

On vaginal examination, the cervix is low down in the pelvis and the os looks downwards and forwards. The finger feels the supra-vaginal portion of the cervix through the posterior fornix and may be able to reach the fundus, but the posterior surface is straight—there is no angle of flexion.

On bimanual examination, the hands can meet in the anterior fornix with nothing but the vaginal and abdominal walls between them. It is difficult to make out the body of the uterus; we may try to do this in two ways. *First*, with one finger in front of the cervix and the other behind it, lift the uterus upwards towards the abdominal walls; the hand placed on the abdomen will feel the anterior surface of the body of the uterus moving under it. *Second*, tilt the cervix well forwards with the index finger in the vagina, and thus increase the retroversion; the middle finger will feel the body of the uterus through the posterior fornix.

The rectal examination is of great service here. The sound will pass as in Fig. 93.

The differential diagnosis is the same as in retroflexion. The only point requiring special notice here is that we may have a retroversion with an anteflexion high up. Cases of anteflexion due to cicatrisation of the utero-sacral ligaments are often, from the backward direction of the cervix, diagnosed as a retroversion (*v.* p. 21).

TREATMENT.

This consists in (1) removing existing inflammation; (2) replacement of the uterus, when not fixed by adhesions; (3) retention of it in its normal position by pessaries. These will all be considered under retroflexion.

When adhesions are present, massage may be tried with a view to stretching these; or we may be content by supporting the retroverted uterus with a pessary.

RETROFLEXION.

For convenience this condition is usually called "Retroflexion," to distinguish it from "Retroversion" already described; strictly speaking the condition is RETROVERSION + RETROFLEXION.

PATHOLOGY.

The pathological changes in the position and structure of the organs in the pelvis consequent on retroversion + retroflexion, can only be learned from sections made with the organs *in situ*. An exact knowledge of these

changes is very desirable, as this displacement, with its accompanying complex train of symptoms, is one of the most important which comes under the notice of the gynecologist.

We are indebted for the following facts chiefly to Fritsch, although he seems to base them more on clinical examination than on pathological study. The changes in the various structures will be considered separately and shortly.

The *cervix* is directed downwards and forwards, or directly downwards (*v.* Fig. 209). We observe clinically that it is much more easily reached. This is due partly to the alteration in its direction and position (being nearer the symphysis pubis it is more within reach), partly to the sinking down of the uterus as a whole in the pelvis. The os is patulous, because retroflexion usually implies previous parturition. If deeply fissured, it may form a gaping cleft which readily admits the tip of the finger. There is often ectropium and cervical catarrh. Sometimes there is marked hypertrophy of the posterior lip, so that it is mistaken for the projection of the whole vaginal portion.

The *uterus* is flexed on itself, so that the fundus lies in the pouch of Douglas, the depth to which the fundus descends and the acuteness of the angle of flexion varying in different cases (*v.* Fig. 209). If the condition of the uterine walls offers no resistance to flexion, the intra-abdominal pressure will tend to drive the fundus downwards till equilibrium is maintained—that is, till the fundus rests in the bottom of the pouch of Douglas. In retroflexion, there is no counteracting force operating from below similar to that of the distending bladder in anteflexion.

The size of the uterus is increased, and its cavity measures more than two and a half inches. Since the flexion generally occurs while the uterus is still enlarged through subinvolution, it is difficult to say whether this hypertrophy arises as the direct result of the displacement or through its interfering with the process of involution. Whatever the cause of this hypertrophy is, its effect is to interfere with the natural cure of the displacement. The thickness of the uterine walls at the angle of flexion varies in different cases. Sometimes neither wall is atrophied at the point of flexion (Fig. 207). Barnes says that according to his clinical experience this is the usual condition. On the other hand, Fritsch states that he has found marked thinning of the *posterior* wall at the angle of flexion. It is interesting to note that in a case of *congenital retroflexion* (see Fig. 208) described by Ruge it is the *anterior wall* which is atrophied

at the angle. The mucous membrane of the uterus is generally in a condition of chronic catarrh.

The microscopic changes consist in a dilated condition of the blood-

Fig. 207.

Extreme retroflexion of uterus (Barnes).

vessels, with increase of connective tissue—the appearances produced by long continued passive congestion. At the point of flexion, however, an

Fig. 208.

Congenital retroflexion (Ruge). Note the thinning of the anterior wall of the uterus.

opposite condition has been described ; the blood-vessels were compressed and the tissues atrophied.

The *ovaries* follow as a rule the displaced fundus, the thin infundibulo-pelvic ligament stretching more readily than the ovarian. The position of the ovaries will, however, depend on the effects of peritonitic adhesions, which may fix them in any position. Sometimes we feel them below the fundus in the pouch of Douglas. They are frequently enlarged and tender on pressure.

The *bladder* is not necessarily altered in position, but has no longer the uterus resting upon it. The utero-vesical pouch is obliterated in cases of well-marked retroflexion. The ureters are often compressed or bent, which leads to dilatation; frequently they are found dilated to the thickness of the finger. Fritsch observed in one case the left ureter obliterated by a mass of cicatricial tissue, and the corresponding kidney changed into a sac full of white atheromatous debris.

The *rectum* has the retroflexed fundus pressing against its anterior wall and diminishing its cavity.

The *peritoneum* is altered in its normal relations as follows. The broad ligaments have their surfaces reversed, that is to say, the anterior, which was formerly inferior, is now superior; from their attachments, they offer no obstacle to retroflexion. The utero-vesical pouch is necessarily obliterated. The pouch of Douglas must, on the other hand, be distended by the fundus uteri; this implies a *stretching of the utero-sacral ligaments* associated with the alteration in position of the cervix.

The *pelvic nerves* are occasionally affected, as shown by weakness in the lower limbs. This loss of power must be produced reflexly; from the anatomical relations, the retroflexed fundus cannot compress the motor nerves of the sacral plexus, as is sometimes affirmed.

ETIOLOGY.

Retroflexion of the uterus is the commonest pathological condition next to pelvic inflammation, which we are called on to treat. It is rarely present as a congenital condition, in which respect it contrasts with anteflexion. It is frequent in multiparæ (rare in nulliparæ) because the etiology is specially related to the *puerperal condition*. In this condition the uterus is enlarged and heavy, and its walls are soft. The ligaments are lax, and the tissues of the pelvic floor have been recently stretched and have not recovered their tone. Through the distention of the bladder, the uterus is often thrown into a retroverted position.

We sometimes find on examining a patient shortly after her confinement that the uterus is lying back in the pelvis even though the bladder be not distended; we may thus suppose that the *intra-abdominal pressure* (which, when the uterus is in its normal position, is directed upon its posterior surface) comes now to act on the anterior surface, and drives the fundus backwards and downwards. If the uterine tissue is soft enough to allow the fundus to be flexed on the cervix, such a flexion will gradually take place when the patient makes straining efforts. Apart from this, the *dorsal posture* and the common practice of *tight bandaging* after confinement will favour backward displacement of the fundus. If the patient *rise too soon*, while the uterus is still large and heavy and the uterine supports correspondingly lax and weak, the tendency to displacement is increased.

The cause of retroflexion in nulliparæ is obscure.

SYMPTOMS.

The following are the more important local symptoms:

Weakness in the back,
Symptoms of chronic pelvic peritonitis,
Painful defecation;
Leucorrhœa,
Dysmenorrhœa,
Menorrhagia;
Sterility,
Abortion.

In long-standing cases, there may follow the train of general constitutional symptoms consequent on chronic uterine disease.

The symptoms are arranged in three groups: the first, including those which are more or less continuous; the second, those which are within the menstrual period, variable or periodic; the third, those connected with the function of reproduction.

Weakness in the back is the most common complaint. It may amount to actual pain, which is aggravated on muscular exertion and generally at the menstrual periods. The symptoms of *chronic pelvic peritonitis* are usually present; the feeling of weight and discomfort in the pelvis is sometimes due to the stretching of old adhesions. The importance of pelvic inflammation, fixing the uterus in its abnormal position and preventing

its replacement, we shall consider under treatment. *Painful defecation* with tenesmus is explained by the relation of the loaded rectum to the retroflexed uterus; irritation from pressure of the fundus against the wall of the rectum produces straining efforts even though there be no fœcal matter in the rectum.

The *leucorrhœa* is due to chronic inflammation of the mucous membrane. As the result of the displacement, there is passive congestion of all the tissues of the uterus; this leads in the first instance to a simple hypersecretion of mucus, which gradually passes into chronic inflammation. The mucous secretion is more marked immediately after the increased congestion of the menstrual period; but, gradually, it spreads itself over the intermenstrual period. *Dysmenorrhœa* is not so frequent a symptom here as in anteflexion; the explanation is, on the mechanical theory, that retroflexion usually occurs in multiparæ where the cervical canal is patulous. *Menorrhagia* forms one of the more prominent symptoms; it is due partly to the chronic inflammation of the mucous membrane, partly to obstruction to the return of the blood from the uterus.

The *reproductive function* is variously and seriously affected. This is brought prominently under our notice, because retroflexion usually occurs in one who has already been pregnant, and presents an obstacle to further conception. Frequently, the patient tells us that she had a child several years ago; that she has suffered from pain in the back, leucorrhœa, and irregular menstruation since that time and has never conceived again. With this history, we commonly find retroflexion of the uterus. The *sterility* may, of course, be due to a variety of causes—the altered position of the cervix, the increased mucous secretion, obstruction of the Fallopian tubes, malposition of the ovaries. We cannot therefore be sure of curing the sterility by replacing the uterus, although we frequently find that the patient *does* conceive shortly after this treatment. After conception has taken place, there is the further risk of *abortion*; with a history of repeated abortion, we often find retroflexion. Conception may take place in a retroflexed uterus, which may afterwards right itself so that pregnancy goes on to the full time. Abortion is due to the inability of the uterus thus to right itself, or to the pathological condition of the mucous membrane which prevents the ovum from becoming securely attached. When abortion does not occur and the pregnant uterus does not straighten itself so as to grow upwards into the abdomen, it enlarges without the undoing of the flexion: in this case it will expand more and more into the hollow of

the sacrum and become wedged below the promontory. This constitutes Retroflexion of the Gravid Uterus (*v.* Disturbances of the Reproductive Function, Section IX.).

DIAGNOSIS.

On *vaginal* examination the cervix is felt low down in the pelvis, the cause of which has been explained under Pathology. The os looks directly downwards towards the perineum. A firm round body is felt in the posterior fornix, continuous with the cervix uteri but separated from it by a groove more or less distinctly marked according to the amount of flexion. Place the forefinger on the cervix, and the middle finger on this body; on moving the former, the latter moves with it.

But a fibroid tumour of the posterior wall would produce similar con-

Fig. 209.

Diagnosis of retroflexion by bimanual examination.

ditions; therefore, make the *bimanual* examination. First place the vaginal fingers in the anterior fornix and make pressure with the external hand until the fingers of both hands meet; there is nothing between them except the abdominal and vaginal walls, the fundus is therefore not to the front. Now put the vaginal fingers into the groove behind the cervix, or, better still, lay hold of the cervix with the index finger in front of it and the middle finger in the groove behind (see Fig. 209), and lift up the uterus as high in the pelvis as possible; make pressure with the external hand

until the cervix lies fairly between the hands; the upper surface of the uterus is felt to curve backwards. In a favourable case (with lax abdominal walls) we can do the bimanual examination on a still deeper plane, and get both hands to meet behind or at least fairly embrace the retroflexed fundus. Having ascertained that the fundus uteri is retroflexed, we ask ourselves whether it be fixed or movable—*whether it can be replaced or not.* In making our diagnosis we at the same time take a step towards treatment. To ascertain the mobility of the fundus, make steady pressure on it upwards; observe whether it gives way before the finger, and whether, on its yielding, the flexion becomes undone or the uterus simply rotates as a whole; note also whether this manipulation causes pain.

The *rectal* examination has this advantage, that the finger passes upwards over the free surface of the fundus without displacing it. It is indispensable in cases where the rigidity of the abdominal walls prevents our getting the uterus between the hands in the bimanual. The drawing down of the uterus with the volsella is an additional help in such cases, as it enables the finger in the rectum to reach the fundus.

The *sound* confirms the diagnosis in doubtful cases, and tells us further whether the retroflexed uterus is enlarged. Before using the sound, we must palpate the uterus carefully to ascertain that it is not becoming enlarged with a growing ovum and inquire as to the patient's menstruation. We curve the sound to correspond with the degree of flexion ascertained on bimanual examination. If introduced with the concavity directed backwards, it passes into the uterine cavity without our having to make the rotation (*v.* Fig. 93); through the posterior fornix, we feel the end of it in the retroflexed fundus; it usually passes in beyond the two and a half inches. We can also learn from the sound whether the uterus can be replaced or not; but it is better to get the information from the bimanual examination. The sound is of most use in differential diagnosis.

Differential Diagnosis.—The following are the conditions arranged in the order of frequency, which might be mistaken for retroflexion:—

Fæces in the rectum;

Pelvic deposit in the pouch of Douglas { Peritonitis, Hæmatocele, Carcinoma;

Cellulitis behind the cervix;

Myoma of the posterior wall;

Prolapsed ovary or small ovarian tumour.

Fæcal matter in the rectum gives rise to difficulty only on superficial examination. We should always decline to give an opinion as to the condition of the pelvic organs when the rectum is loaded. If this be attended to, no mistake in diagnosis will be made under this head.

Pelvic deposit in the pouch of Douglas gives rise to more difficulty, because it may closely simulate the condition found in retroflexion—"a body felt through the posterior fornix and moving along with the cervix." Such a deposit will be proved not to be the fundus uteri by our finding the latter in another position. If inflammation is present, it is difficult to make the examination necessary to ascertain this; we may not be justified in using the sound just where it would give us the desired information. Such cases present great difficulty in diagnosis, and the true condition can only be ascertained on repeated examination or after the inflammation has subsided.

Cellulitis behind the cervix is rarely present in such a form as to give rise to a mistake in diagnosis, unless the inflammation renders the necessary examination difficult.

A *myoma* projecting posteriorly from the lower segment of the uterus resembles, in form and firmness, the retroflexed fundus. On bimanual examination, however, we find that we have between the hands a larger body than the uterus alone. The fundus may also be felt to the front, and distinct from the tumour. To ascertain its position, it is best to make the bimanual examination with the sound in the cavity of the uterus. Fig. 198 shows the information given by the sound, if we suppose that the structure to the left of the figure is the rectum. A fibroid tumour accompanied by inflammation presents great difficulty.

If the *ovary* be *prolapsed*, enlarged through inflammation, and adherent to the posterior aspect of the uterus, it simulates (on vaginal examination) the retroflexed fundus. So also does a small *ovarian tumour* lying in the pouch of Douglas, though it is softer and more elastic than the uterus. The bimanual examination, supplemented if necessary by the use of the sound and the drawing down of the uterus with the volsella, enables us to ascertain the exact position of the fundus and its relation to the tumour.

PROGNOSIS.

The prognosis depends upon the mobility of the uterus, and the possibility of replacing it. It is always less favourable where inflammation is

present, though we have seen considerable exudations become after a time absorbed, and the uterus again movable so that it could be replaced. As regards the probability of future conception, our statements should be guarded, though the probabilities are greatly increased if we can replace the uterus.

Whether a permanent cure of the displacement, so that the uterus will keep its normal position after the instrument is removed, is often effected, we have not much definite information. A priori, we should not expect that the stretched utero-sacral ligaments would readily become shortened again unless a pregnancy supervene. The curability of the retroflexion depends, according to Mundé, on the *recentness of the displacement*: "recent displacements of any variety are the only cases which offer a fair chance of complete recovery by any of the mechanical means at our disposal." The length of time during which a pessary must be worn so as to effect a cure of recent puerperal retroflexion is, according to Mundé, six months to a year.

TREATMENT.

This consists of two parts:

1. Replacement of the retroflexed uterus;
2. Retention of it in its normal position by suitable means.

The first question which suggests itself on discovering a retroflexion is, whether we can replace the uterus: this has been ascertained at the same time as we made the diagnosis.

The two obstacles to treatment are the presence of existing inflammation and the fixation of the uterus in its abnormal position. The former must be treated by blistering, hot water injections, and the use of the glycerine plug; these may have to be continued for a month or more, and then we may attempt the reposition. This last may be impossible through the firmness of the flexure or the presence of old adhesions. It must be left to the operator to determine how much force he is justified in employing. Sometimes it is necessary to put the patient under chloroform. In cases where we cannot replace the uterus, benefit may be derived from simply supporting it with a pessary.

Let us suppose that we are treating a case suitable for reposition, after inflammation has subsided.

1. *Methods of Replacing the Retroflexed Uterus.*

These are the three following:

(1.) By bimanual vagino-rectal manipulation;

(2.) With the sound;

(3.) By genupectoral posture, combined with traction on the uterus with the volsella and (if necessary) pressure on the fundus with the finger in the rectum.

(1.) The bimanual manipulation is the safest method, and can be at once proceeded with as soon as we have diagnosed the pathological condition. We thus make the diagnosis, form the prognosis, and begin the

Fig. 210.

Reposition of the retroflexed uterus with the finger in the rectum.

treatment at one examination. The replacement is best effected with the index finger in the vagina and the middle finger in the rectum. If with both fingers in the vagina we make pressure through the fornices, we simply push the uterus, as a whole, upwards. With the finger in the rectum, however, we get behind the uterus and push it forwards. Place the patient in the dorsal position; pass the fingers into the vagina and rectum, as in the accompanying diagram (Fig. 210). Make steady gradual pressure on the posterior surface of the fundus with the middle finger. Direct the pressure to one side of the middle line, so as to keep the fundus clear of the promontory of the sacrum. With the index finger placed *in front of the cervix*, push it backwards and thus rotate the fundus forwards.

Having by this manœuvre brought the fundus uteri to the front (into the position indicated by the dotted line in the diagram), make with the external hand steady downward pressure so as to get between it and the hollow of the sacrum and thus depress the fundus still more to the front. A glycerine plug is now placed in the vagina to keep the uterus in position. The plugging should be chiefly in the anterior fornix, so as to exert upward pressure on the cervix and thus favour the tilting of the fundus forwards. On the following day, if there be no indication of inflammation, a pessary may be introduced.

(2.) Replacement with the sound has the advantage that it causes less discomfort to the patient; it is therefore the method generally employed. We may have the sound already in the uterus to make sure of our diagnosis, and (without withdrawing it) we can proceed at once to effect the reposition. In the employment of force we require to be more careful than in the bimanual manipulation, because the sound gives us greater leverage, the pressure is being made on the mucous membrane of the uterus, and there is not the same delicate sense of resistance as when the finger is immediately in contact with the uterus. The end of the sound should not be too much curved. If the flexion be pretty acute, so that the sound requires to be well curved to pass easily into the body of the uterus, we should first reduce the acuteness of the flexion by repeatedly passing in the sound more and more straightened. Having by this means partially converted the retroflexion into a retroversion, we proceed to reposition as follows. The sound lies as in position 1 in the figure (Fig. 211); the direction of the handle is backwards, and the roughened face looks to the back; the intra-uterine portion (1) also has the curve backwards. Now lay hold of the handle loosely, rather allowing it to lie between the fingers than grasping it. Carry the handle upwards towards the patient's right buttock (as she is on her left side) forwards with a wide sweep and downwards again towards the couch, the shaft describing half of a cone. The sound thus comes to lie in position 2 in the figure: the direction of the handle is forwards, and the roughened face is now to the front; the intra-uterine portion of the sound has also rotated, so that the curve is now forwards, but the uterus as a whole is still to the back (Fig. 211, 2, 2). Now carry the handle of the sound gently and slowly backwards, in a straight line, towards the perineum. The sound now lies in position 3; the roughened surface is to the front, but the handle is now directed backwards; the fundus uteri is consequently in its normal

position (Fig. 211, 3). The reason for this manipulation is evident. If we rotated the handle of the sound forcibly round its long axis (bringing it at once from position 1 to 3), the intra-uterine portion would describe a wide curve within the uterine body and probably produce laceration of the mucous membrane. Before withdrawing the sound we make sure by external palpation that the fundus uteri is to the front, as the latter is more easily felt when stiffened by the sound. After withdrawal of the sound the uterus must be kept in position by the glycerine plug or pes-

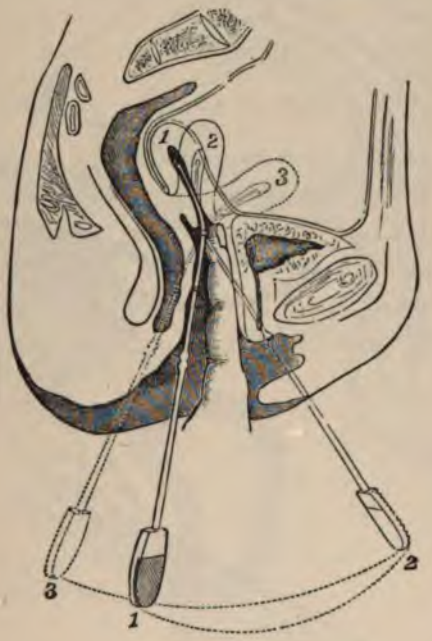

Fig. 211.

Replacement of the uterus with the sound. 1, 2, 3, the successive positions of the sound and of the uterus.

sary. Frequently we find that the uterus falls back into its abnormal position as soon as the sound is withdrawn; in such cases, the pessary should be slipped in over the handle of the sound and put in position before the latter is withdrawn.

Various forms of uterine repositors have been devised by Sims and others. They might be compared to a sound having the intra-uterine portion jointed to the stem, on which it can be rotated antero-posteriorly by a suitable mechanism. They are not of such practical value as to re-

quire further description here. No mechanism can equal the fingers in nicety of action.

(3.) The importance of the genupectoral posture in replacing the retroflexed uterus has been brought forward by H. F. Campbell. On placing the patient in this posture, the abdominal contents gravitate downwards and forwards; this displacement withdraws the internal pressure from the pelvic floor, so as to subject it to the atmospheric pressure

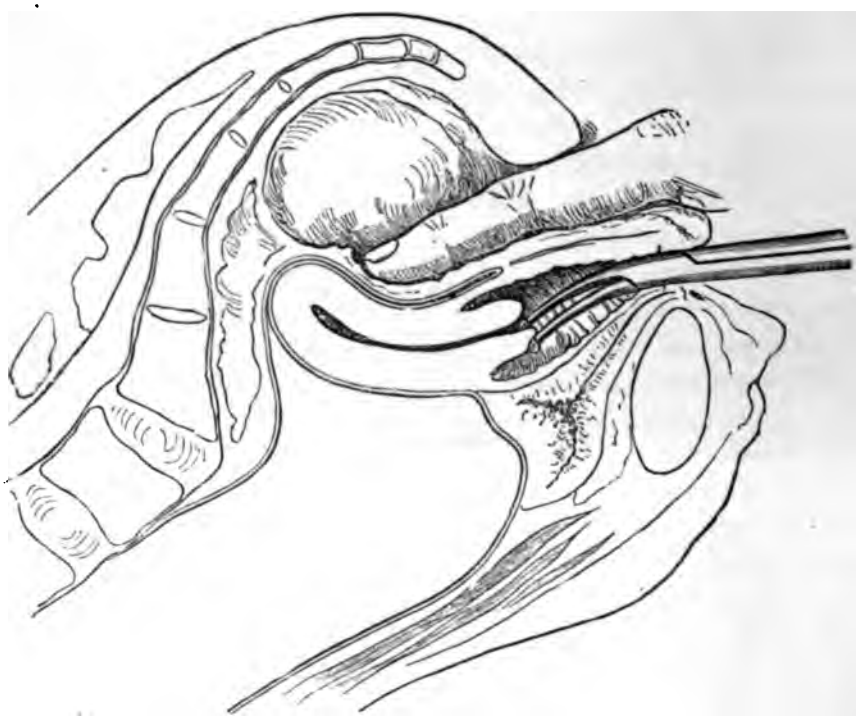

Fig. 212.

Replacement of the uterus with the volsella and the finger in the rectum; the patient is in the genupectoral position.

from without. If the vaginal orifice be now opened, the vaginal cavity becomes distended with air; if the walls are lax, the cavity may be so large that the finger reaches the cervix with difficulty. The position of the uterus changes;[1] but the retroflexed uterus does not become replaced,

[1] For a full account of changes produced by the genupectoral posture, the student should consult the Atlas of the Relations of the Abdominal and Pelvic Organs in the Female; Simpson and Hart, 1881.

as Campbell supposed. It moves as a whole near the sacrum; and, if already retroverted, it becomes still more so. To effect replacement, we must either push the fundus forwards or draw the cervix backwards. It is best to combine these actions; having laid hold of the cervix with the volsella per vaginam, we draw it downwards while with the index finger of the right hand, per rectum, we press the fundus upwards (see Fig. 212). This method of reposition is specially applicable to cases of retroflexion of the gravid uterus.

Having replaced the uerus by one of these methods, we have to retain it in its normal position.

2. *Methods of Retaining the Replaced Uterus.*

The retention of the uterus in its normal position is effected by vaginal pessaries. Of these the best forms are the Hodge or, its modification, the Albert Smith.

The *material* of which they are made is vulcanite, which is light and smooth and not affected by vaginal discharges. To bend the vulcanite, the pessary should be placed in hot, almost boiling, water. It is thus

Fig. 213.
Hodge pessary.

made pliable and can be moulded to the desired form, but becomes firm again on placing it in cold water; this is also effected by oiling the pessary and heating it in a spirit lamp. Pessaries are also made of gutta percha, which has the advantage of being easily moulded; these cannot, however, be worn for a long time, as the gutta-percha is absorbent and, retaining the secretions, sets up irritation. The patient can wear one for a few weeks till we see that it fits comfortably and is effective, and then we can substitute one of a similar form made of vulcanite.

The *form* of the Hodge is an elongated horse-shoe, with a straight transverse bar joining the free ends. Seen from the front (Fig. 213), it

has a curved upper end which is adapted to the posterior fornix; the lower end consists of a straight bar which serves to keep the sides apart and lies under cover of the symphysis pubis; the external angles of this end are rounded to prevent their cutting the vagina; the sides run almost

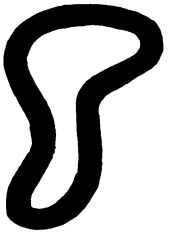

Fig. 214.

Albert Smith pessary.

parallel. Seen from the side (Fig. 215), it is a mould of the vaginal slit; there is an upper sacral curve, which is long and well-marked; there is a lower pubic one, which is not necessarily present or is only slightly marked. The pessary lies so that the concavity of the sacral curve looks forwards, that is to say, the upper end of the pessary (like the posterior fornix vaginæ) curves forwards. The Albert Smith (Fig. 214) contracts in its lower half to a more or less beak-shaped end; seen from the side, it has the pubic curve more marked (Fig. 215). Scientifically it is the more

Fig. 215.

Side view of Albert Smith pessary. The Hodge is similar, but has the lower curve less marked.

correct form, because the posterior wall of the vagina is narrower below than it is above. The lower end should not be too much contracted, otherwise it is apt to interfere with married life; also when the vaginal orifice is wide, it favours the expulsion of the instrument. A second modi-

fication of the Hodge is recommended by Thomas, in which the upper bar is thicker, the sacral curve more pronounced, and the whole instrument longer.

The *choice of an instrument* suitable to the case must be made. The pessary should be narrower and shorter than the posterior vaginal wall, so that it produces no tension when it is in position. The upper bar should be of such a size that it can be passed in easily ; the lower should be

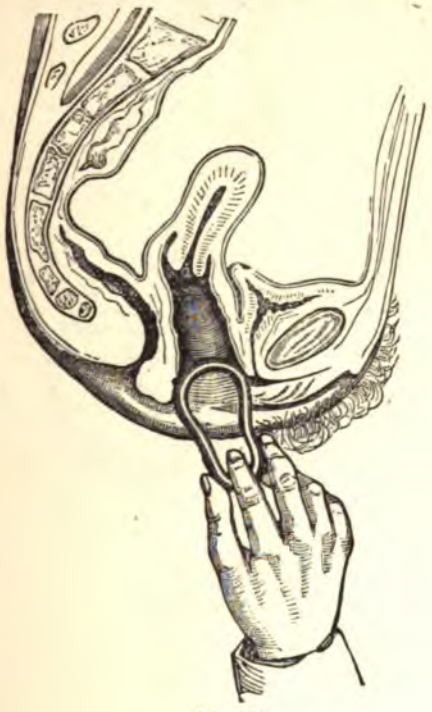

Fig. 216.

Introduction of pessary.

narrower than the upper, but not too narrow for the reasons given above. The proof of a good fitting instrument is that the patient does not feel its presence, nor should it interfere with married life.

The *mode of introduction* of the pessary demands special attention. It is important that this apparently simple manœuvre be effected without causing pain to the patient. From the fact that the vulvar orifice is antero-posterior while the cavity of the vagina is transverse, the instrument must be introduced with its plane surface horizontal (the patient is supposed to be on the side) and afterwards rotated so that this comes to

be vertical. From the position of the cervix, the instrument is very liable to run into the anterior fornix. When in position the upper end must curve forwards. Having oiled the instrument, grasp it with the lower end (the square end in the case of the Hodge, the narrower end in the case of the Albert Smith) between the finger and thumb of the right hand. Separate the labia with the first and second fingers of the left hand; when the vaginal orifice is narrow hook back the fourchette with one finger, or get the posterior corner of the end which is being intro-

Fig. 217.

Pessary carried on by finger.

duced within the vaginal orifice, and press back the perineum with it so that the anterior corner is not pushed against the clitoris or vestibuli. Now push the pessary backwards in the axis of the vagina till it is half within the cavity (see Fig. 216), and rotate it so that the concavity of the sacral curve looks forwards. Pass the index finger behind the instrument into the vagina, and place the tip of it against the upper bar; carry the pessary onwards, keeping the upper bar well against the posterior vaginal wall to prevent its slipping up in front of the cervix (Fig. 217).

The *position* and *action* of the pessary when *in situ* are as follows:—

It lies exactly adapted to the vaginal walls (see Fig. 218); the upper end being in the posterior fornix behind the cervix, the lower just within the

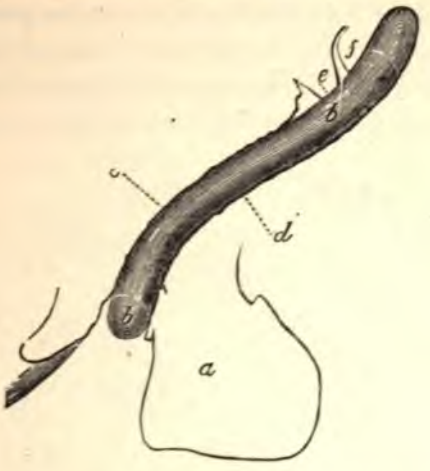

Fig. 218.

Pessary *in situ* in the vagina, *ad naturam*. *a*, perineum; *bb*, pessary; *c*, anterior, and *d*, posterior vaginal wall; *e*, anterior, and *f*, posterior lip of cervix.

vaginal orifice. It is kept in position through its resting on the oblique anterior face of the sacral segment of the pelvic floor, against which it is compressed by the posterior face of the pubic segment.

Fig. 219.

Hand holding Albert Smith pessary.

The student will readily understand and remember the position of the pessary in the following way. Hold the hand inclined as in Fig. 219,

with the palm slightly inflexed. It resembles the posterior vaginal in the following points: (1) it is broader above than below; (2) it curves forwards above; (3) from its obliquity, it allows the pessary to sit on it. Now place the pessary on it. It will only lie adapted to the hand when the broad end is above and the upper curve is directed forwards.

The Hodge pessary does not act as a lever; that is to say, the intra-

Fig. 220.
Position and action of pessary.

abdominal pressure does not act specially on the lower bar and depress it, causing the superior one to rise. The intra-abdominal pressure acts nearly equally on both bars, of which fact the student may satisfy himself clinically. Its action is that the *upper bar gives a point d'appui to the posterior fornix*. The posterior vaginal wall runs round the upper bar as on a pulley, and, as it is inserted into the cervix, the latter is thereby drawn upwards and the fundus thrown forwards (Fig. 220). The pessary, therefore, has the same action as the utero-sacral ligaments, if we suppose that

these keep the cervix backwards. This is only the action in the case of a retroverted uterus which has been replaced. A vaginal pessary, however, gives relief even though we may not be able to replace the uterus. In this case we must suppose that it acts by supporting the uterus as a whole, thus diminishing tension on the ligaments and passive congestion.[1]

Another way of showing how the Hodge pessary acts is as follows. With the patient lying on her left side, pass the index finger into the posterior fornix vaginæ and push it up in a direction parallel to the posterior vaginal wall. This necessarily pulls the cervix back, and thus the fundus is kept forward (see Fig. 66). In other words, if the cervix be thus kept back by the tension of the finger in the posterior fornix, the uterus cannot become retroverted although the fundus may become retroflexed. Now if a Hodge pessary be passed into position and held by the hand, it will act just as the finger does. It does not require to be held, however, as it rests on the oblique sacral segment and is pressed against it by the pubic segment and abdominal viscera. Note that the pressure on the Hodge is at right angles to the posterior vaginal wall; there is no side to side pressure on the instrument, and thus it does not require to extend from side to side of the vaginal walls.

The after-watching of the case is important. The patient should be instructed to return in two days to see that the instrument is in place, and to return at once if it causes pain. After this she should report herself occasionally, say at intervals of a month, when examination is made to ascertain that the uterus keeps its place. If she uses hot water injections occasionally, it is not necessary to remove the instrument to clean it more frequently than this. After the pessary has been worn for some months, it may be removed to see if the uterus remains in position without it. Sometimes we find that the uterus falls back again into its abnormal position as soon as the instrument is withdrawn; in such a case, it must be introduced again, and may have to be worn for years. Should conception occur, the pessary may be worn till the fourth month, after which the uterus rises above the brim and there is no longer reason to fear displacement.

In some cases the uterine tissue is flaccid at the angle of flexion, and the body falls to the back or front as if it were jointed to the cervix.

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[1] See Hart on The Structural Anatomy of the Female Pelvic Floor; and Granville Bantock on The Use and Abuse of Pessaries, London, 1878.

Here the Hodge, which acts on the body through the cervix, does no good; the intra-uterine stem, along with a Hodge, which has transverse bars, does good in some of these cases. Wynn Williams has devised a good form of pessary on this principle.

From what has been said on the action of the Hodge pessary, it is evident that in the treatment of Retroversion + Retroflexion *the version alone is affected by the pessary.* Whether the flexion is remedied will depend on the state of the uterine walls and the effect of intra-abdominal pressure upon them.

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CHAPTER XXXII.

INVERSION OF UTERUS.

LITERATURE.

Atthill—Inversion of Uterus due to Fibroid Tumour: Dublin Medical Journal, Feb., 1879. *Barnes*—Op. cit., p. 721; and Med. Chir. Trans., 1869. *Crosse*—An Essay, Literary and Practical, on Inversio Uteri: Trans. Provincial Med. and Sur. Assoc., London, 1845. *Duncan, Mathews*—On the Production of Inverted Uterus: Edin. Med. Jour., May, 1867. *Emmet*—Principles and Practice of Gynecology: Churchill, London, 1880, p. 410. *Fritsch*—Die Lageveränderungen der Gebärmutter: Billroth's Handbuch für Frauenkrankheiten: Stuttgart, 1881. *M'Clintock*—Diseases of Women: Dublin, 1863, p. 76. *Macdonald*—Two Cases of Chronic Inversion of the Uterus: Edin. Obst. Trans., vol. VI., p. 170. *Spiegelberg*—Archiv. f. Gyn, IV., S. 350, and V., S. 118. *Thomas*—Op. cit., p. 453. The essay by Crosse gives the fullest anatomical description of inversion, and contains a series of lithographic plates of specimens. The literature up to 1879 is fully given by Fritsch. Other references are given as foot-notes.

PATHOLOGY.

In inversion the uterus is turned inside out, so as to form a polypoidal projection into the vagina; its peritoneal surface is converted into a cup-shaped hollow; its mucous membrane becomes *everted* so as to lie exposed on all sides in the vagina.

The mechanism by which this condition is brought about is the following.

1. A portion of the muscular wall of the uterus *having lost its tone,* becomes depressed towards the uterine cavity. In the puerperal condition this is usually that portion of the wall to which the placenta has been attached, and the condition has been described by Rokitansky as "paralysis of the placental seat;" this partial inversion will be frequently found on abdominal palpation in cases of post-partum hemorrhage (Fritsch). In cases of tumour growth, fatty degeneration (Scanzoni) or malignant infiltration (A. R. Simpson) weakens the wall of the uterus round the base of the polypoidal growth, and thus produces an analogous condition.

2. *Muscular contractions* of the non-depressed portion of the uterus, combined with *intra-abdominal pressure*, carry the depressed portion further into the uterine cavity, until the fundus uteri reaches the os internum (Fig. 229). In the puerperal condition, muscular contractions are present of themselves or are produced by the presence of the placenta; in the case of a polypoidal tumour, they are due to the presence of the foreign body. *Traction from below*, such as the pulling away of the placenta or the tension of the pedicle of a polypus which is being extruded, also produces inversion.

3. The fundus of the uterus, by continuation of the same process, dilates the cervical canal and is "born" into the vagina (Fig. 226).

In some cases inversion seems to take place from below upwards with a mechanism similar to that of prolapsus uteri, the lower part of the body of the uterus becomes inverted into the cervical canal (Taylor).

Mathews Duncan, whose paper was a valuable contribution towards establishing the correct theory of inversion, distinguishes between active and passive inversion. The active is that described above; the passive is produced by inertia of the whole uterus, in which the organ is driven down entirely by intra-abdominal pressure or by traction from below—and not by uterine contractions.

It is evident that the process may become arrested at any of these stages and persist as a permanent condition. When it has persisted for a few weeks, it constitutes "chronic inversion;" this is found in the following forms. (1.) Inversion of one horn only is a rare occurrence. Slight inversion of the uterine wall, at the base of a polypoidal fibroid, has been more frequently observed. (2.) Partial inversion, when the fundus has descended as far as the os internum, is also found as a chronic condition. (3.) Complete inversion is the condition most frequently met with.

An exact knowledge of the relation of parts in *complete inversion* is necessary for diagnosis and treatment. This can only be gained by studying the inverted uterus as seen in section (Fig. 221). We must study the position of—

The body of the uterus,
The cervix uteri,
The Fallopian tubes and ovaries,
The peritoneum,
The bladder.

The Body of the Uterus.—The inversion extends, in simple uncomplicated cases (see below), as far as the os internum but *no further*. The uterus lies partly in the vagina, partly in the cervical canal. Its neck is embraced by the os externum, which may lie loosely on it (favouring hemorrhage) or constrict it firmly (favouring gangrene). After involution takes place, it becomes small, rounded and of firm consistence, closely resembling a pediculated fibroid tumour; and it has been amputated by mistake for such. It has a rounded form, is of a softer consistence and deeper red colour than a pediculated fibroid, and has a smooth and slippery surface which bleeds freely when handled. The softness may be so marked that the uterus moulds itself to the vaginal cavity and,

Fig. 221.

Inversion of uterus (half-size, Barnes from Crosse's essay). The fundus lies in the vagina; the cervix is not inverted; the lips are flattened out to a swelling seen below the angle of inversion. The ovaries (seen from behind) are not in the peritoneal sac.

becoming flattened against the posterior vaginal wall, takes on a mushroom-like form (Freund).

The mucous membrane of the uterus may undergo all the changes of any tumour with a constricted base and exposed surface. It is usually congested and bleeds easily; it may become ulcerated and even gangrenous, or may be hypertrophied with polypoidal formations; it may lose its single layer of cubical epithelium and develop a stratified squamous epithelium. The occurrence of these changes has an important bearing on the desirability of replacing the organ.

The Cervix Uteri.—This is rarely[1] displaced in simple uncomplicated inversion; it forms a broad ring embracing the neck of the tumour. Sometimes the inversion is complicated with prolapsus, or, more properly, the vagina also becomes inverted and the inverted uterus caps the in-

[1] Crosse figures one preparation in which the cervix was inverted although there was no prolapsus.

verted vagina (Fig. 222). When this occurs, the cervix uteri is also more or less inverted; a part remains just above the os externum, as a depressed ring which also disappears on making traction on the uterus (Fritsch).

The *Fallopian tubes and ovaries*, with some coils of small intestine, may (at first) lie within the inverted cup, which is lined with *peritoneum*; after

Fig. 222.

Inversion of uterus (version of vagina, occasioned by a small sub-mucous fibroid (M'Clintock). *Sm F*, sub-mucous fibroid. Other letters as before.

wards, they retract out of it. In long-standing cases, the rim of the peritoneal cup is contracted by the muscular fibre of the cervix so as scarcely to admit a finger (Fig. 223). In a case of six months' standing, in which A. R. Simpson performed Thomas' operation before having recourse to amputation, the contracted ring just admitted the finger; an ovary was caught within it.

Adhesions rarely form between the peritoneal surfaces; this is an in-

teresting fact and is of importance in regard to replacement. We might have expected detachment of the peritoneal lining or tearing of it by the sudden dislocation; the previous stretching of it during pregnancy is perhaps the reason why this has not been noticed. Fritsch says that the lifting up of the fornices by the tumour in the vagina, diminishes the strain on the peritoneum.

The *bladder*, from its relation to the cervix (*v.* Chap. III.), is not altered

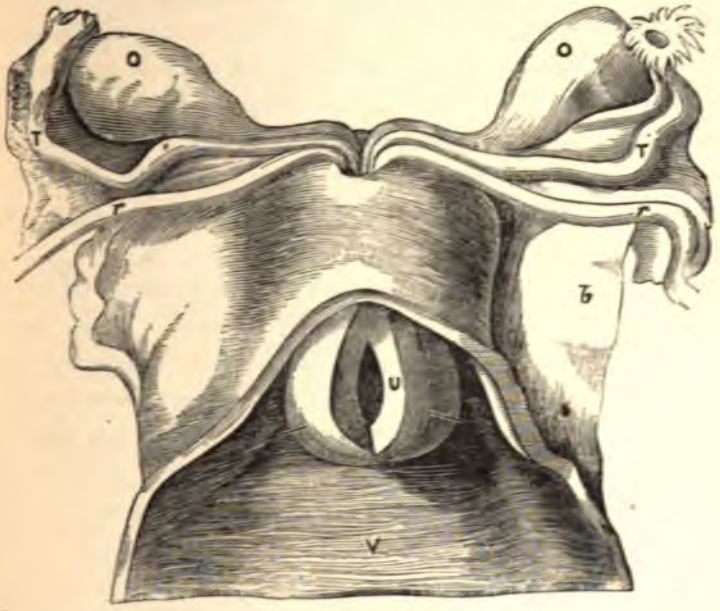

Fig. 223.

Inversion of uterus (Crosse). The inverted uterus (*U*) lying in the vagina (*V*) is cut open to show the peritoneal sac which does not contain the ovaries (*O*); bristles are passed into uterine orifices of tubes.

in position unless there is prolapsus. When the latter occurs, there is cystocele (*v.* Fig. 222). We may therefore contrast the two types of inversion as follows:

Inversion of uterus, cervix and bladder normal in position;

Inversion of uterus + prolapsus (*i.e.*, inversion of vagina), cervix inverted and cystocele.

ETIOLOGY AND FREQUENCY.

Inversion arises under two different conditions.

1. In the puerperium — puerperal inversion;
2. Secondary to intra-uterine tumours growing from the fundus.

Inversion has also occurred independent of the puerperal condition and of tumour growth ; this is quite exceptional.

1. *Puerperal Inversion.*—This is by far the most frequent form ; out of 400 cases, 350 occurred in the puerperal uterus (Crosse).

Its frequency was formerly due to improper management of the third stage of labour. When the uterus was flabby and not contracting and the placenta not coming away, the removal of the latter by traction on the cord drew down the part of the wall to which it was attached and thus inverted the uterus. This accident was favoured by the situation of the placenta over the fundus (Hennig). Since the removal of the placenta by compression (which is best done by the Credé method—with the thumbs of both hands well down behind the fundus so that the uterus may be firmly compressed antero-posteriorly) has been enforced, this accident has become rarer.

A dilated condition of the uterus (distention by blood-clots) or a flaccid condition of the walls favours inversion.

2. *Inversion secondary to uterine tumours* is much rarer. Of 400 cases, only forty (ten per cent.) arose in this way (Crosse). It has been observed with pediculated fibromata (Fig. 222), and will be referred to again when we treat of them (*v.* Chap. XXXVI.). It is peculiarly frequent in sarcoma (*v.* Chap. XLI.). We know of no case where it has followed on carcinoma uteri ; Barnes describes a specimen in which both conditions were present, but does not say which was the primary lesion.

SYMPTOMS.

The symptoms produced by inversion at the time of its occurrence, concern the obstetrician rather than the gynecologist. There is the feeling of something giving way in the pelvis, accompanied with pain, hemorrhage, and sometimes collapse. With complete inversion, there is retention of urine. It often occurs, or at least becomes so marked as to attract the patient's notice, when she has made a straining effort. The cases where the patient says that it first came down several days after labour, are to be explained by supposing that partial inversion occurred after labour but only the final stage attracted attention.

If the uterus be not replaced at the time, the case becomes one of chronic inversion. The symptoms of chronic inversion are—

Hemorrhage,
Pain in the pelvis of a bearing-down character,
Anæmia and weakness

Hemorrhage is the most dangerous symptom. The menstruation is always profuse, as may be easily understood from the fact that the mucous membrane is extended in its area and lies exposed in the cervical canal and vagina. There is also intermenstrual hemorrhage, which comes on unprovoked or on straining.

The *bearing down pain* in the pelvis resembles that felt in prolapsus uteri. It varies indefinitely in intensity; sometimes it is very acute, rarely is it so slight that the patient becomes reconciled to her discomfort and is able for work.

The *anæmia* and *weakness* may be so marked as to cause suspicion of malignant disease.

DIAGNOSIS.

The diagnosis of *recent inversion* is easy. If the placenta has not yet been expelled, the hands laid on the fundus to expel it by the Credé method find that the rounded fundus is replaced by a cup-shaped hollow. The cervix is sometimes lifted up by the inverted uterus, so as to be "high above the pubes, even near the umbilicus" (Crosse). On passing the hand into the vagina to remove the placenta, care is required to recognize what is placenta and what is inverted uterus, and not to increase the inversion in detaching the placenta. If the placenta is already expelled, the hand on the abdomen recognises the same condition; while a large soft body, varying in size according to the extent of the inversion, fills the vagina.

Chronic Inversion.—Before the sound and the bimanual came to the gynecologist's aid in diagnosis, it was impossible to diagnose this condition with certainty. Mistakes were committed by the most eminent surgeons, just because they had not the means of examination which we now possess. Even now-a-days mistakes occur through the hasty making of a diagnosis before all the means of examination have been employed. We therefore describe fully the routine examination.

1. Pass the fingers into the vagina; a rounded and firm or flattened and soft tumour, which bleeds easily, is felt in the vaginal cavity. Sweep the fingers round it, and recognize that it is free on all sides except at its upper extremity. Round this extremity is felt the cervix, the lips and fornices being recognized; or the cervix is thinned out to a ring and the fornices obliterated. If the cervical canal be obliterated by adhesions, the finger will not pass farther up; if it be patulous, it will pass for one-

and-a-half to two inches and find that the cervical mucous membrane is reflected equally all round on to the neck of the tumour.

2. With one finger in front of the tumour and the other behind it, lift it up towards the abdominal wall which is depressed with the external hand till the fingers in the vagina are in contact with it. The external hand feels, in the place of the fundus uteri, a truncated body with a depression in the centre (see Fig. 226).

3. Now pass one finger into the rectum, which first comes on the body in the vagina: drag this body downwards with the noose represented at Fig. 224, as the volsella causes hemorrhage; the finger in the rectum,

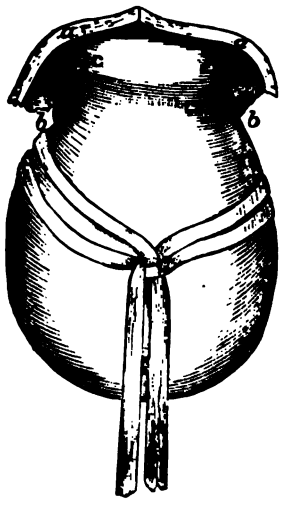

Fig. 224.

Inverted uterus drawn down by tape-noose: *a*, *c*, *b*, line of incision in cervix in Barnes' operation (Barnes).

reaching the upper border of the body, can thus feel that it ends abruptly and can pass into the cup-shaped end. Now depress the abdominal walls till they reach the finger in the rectum, or pass a sound into the bladder and direct the point of it backwards till it can be touched by the rectal finger.

4. The sound may be used to probe round the neck of the body where there is not space for the finger to pass upwards. It is most useful, however, in differential diagnosis.

Differential Diagnosis. Inversion must be differentiated from the following conditions:

1. Polypus in the vagina, simple or with adherent pedicle;
2. Intra-uterine polypus;

3. Uterine polypus with partial inversion ;
4. Prolapsus uteri ;
5. Inversion and prolapsus.

1. In a uterine polypus which lies in the vagina, the fundus will be found to lie somewhere else than in the vagina ; it may be retroverted and thus escape recognition in the bimanual ; the rectal examination will then discover it. Having found what we suppose to be the fundus, pass the sound along the side of the pedicle ; if it is in the uterus, the sound passes more than $2\frac{1}{2}$ inches ; if it passes $2\frac{1}{2}$ inches or less, suspect that partial inversion complicates the polypus.

Fig. 225.

Uterine polypus (after Thomas). The uterus in its normal position. Sound passes into uterine cavity.

Fig. 226.

Inversion of uterus (after Thomas). A cup-shaped depression is in the place of the uterus. Sound arrested at angle of flexion.

Fig. 227.

Uterine polypus. Adhesions round pedicle obliterate cervical canal.

When there are *adhesions round the pedicle obliterating the cervical canal*, a careful bimanual will reveal the fundus in its normal position and justify us in breaking down the adhesions with the sound so as to effect a passage into the uterine canal (Fig. 227).

2. In a uterine polypus which is still *intra-uterine* the differential diagnosis is more difficult. A case has been recorded in which inversion of one horn of the uterus was diagnosed and amputated as a polypus. A careful examination per rectum under chloroform might detect the cup-shaped depression found in partial inversion ; the uterine cavity is always enlarged when a polypus is present (Fig. 228 and Fig. 229).

3. Having satisfied ourselves that there is a polypus, the possibility of there being *partial inversion* of the uterus at its attachment must be kept

in view (Fig. 230). A careful rectal examination might reveal a depression on the peritoneal aspect of the uterus. The greater sensitiveness of the uterine mucous membrane also helps us; thus if we apply the ecra-

Fig. 228.
Polypus still intra-uterine (after Thomas).

Fig. 229.
Partial inversion of uterus (after Thomas). Cavity of uterus relatively too large.

seur without chloroform—which is not necessary—to remove the polypus and the patient has great pain on our tightening up the wire, we may suspect that the loop has embraced the wall of the uterus.

4. *Uncomplicated prolapsus uteri* would only on a very superficial examination be mistaken for inversion. The obliteration of the fornices, the presence of the os externum at the end of the protruded tumour, and that of the uterus within it—as demonstrated by the sound and examination per rectum—show that it is a case of prolapsus. If, however, the pro-

Fig. 230.
Uterine polypus + partial inversion.

lapsus be due to a fibroid tumour of the cervix and the os externum be closed by adhesions or distorted in position, diagnosis is more difficult (v. Uterine Polypi).

5. *Prolapsus + inversion* is a rare condition. The specimen represented at Fig. 222 is quite unique; the apex of the tumour protruding through the vulva consists of a submucous fibroid, the inverted uterus constitutes the next portion, while the base is formed by the inverted vagina.

COURSE AND RESULTS OF CHRONIC INVERSION.

Spontaneous reinversion and cure has been observed in twelve cases (Thomas). From the rarity of its occurrence it is to be regarded as a gynecological curiosity rather than a natural termination; the mechanism of its production is not as yet known.

Toleration of the condition is also rare, though cases are reported in which the uterus has become reconciled to its new position and surroundings and the patient has recovered perfect health.

The greater proportion of unrelieved cases end fatally through anæmia, hemorrhage, septicæmia, or peritonitis.

PROGNOSIS.

As to the hope of reduction—of sixty-six cases collected by Macdonald, forty-four were successful.

TREATMENT.

The reposition of the inverted uterus is one of the gynecological triumphs of the last five and twenty years. Up to 1856 when Tyler Smith effected reposition by gradual compression with an air pessary, the only hope of cure was by amputation with the many risks attendant on that operation. About the same time White of Buffalo (1858), independently succeeded in replacing an inversion by pressure with the hand. After these, a number of successful cases are recorded among which the most noteworthy is one of Noeggerath who replaced an inversion of thirteen years' duration.

Various methods of reduction have been recommended by Tyler Smith, White, Emmet, Courty, Noeggerath, Thomas, Mathews Duncan, Barnes, Braxton Hicks, and Tatit. It would take too much space to describe each method in detail; the references will enable the student to consult the original articles.

The treatment of inversion is best considered as follows:

A. Reposition (*a*) with the hand alone or aided by instruments,
(*b*) by continuous slight elastic pressure;

B. Amputation.

A. Reposition.

The obstacle to reposition is the resistance of the muscular fibre of the lower segment of the uterus; the principle of treatment is to wear out the muscle by steady pressure.

Suppose that we have a case of inversion, how are we to proceed? The patient is kept perfectly at rest for a few days; injections of very warm water are employed twice or thrice daily; a liberal diet is given,

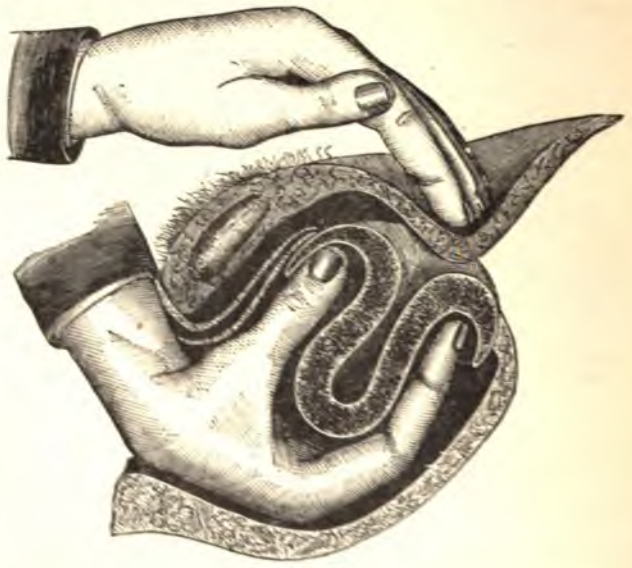

Fig. 231.

Reposition of the inverted uterus with the hand alone (after Emmet).

and iron is usually required for anæmia. Ergot is required if there is menorrhagia; should it not be the menstrual period, the best thing to check hemorrhage is injection of very hot water.

Having thus prepared the patient, we proceed to reposition. Are we to employ the more rapid manual method or the slower one with an instrument? If the patient does not object to an operation under chloroform and if we can have assistants to take turns with us in keeping up manual pressure, the former method should certainly be tried first.

(*a.*) *Reposition with the Hand Alone or Aided by Instruments.*—For a few days previously, the largest size Barnes bag which the patient can bear is placed in the vagina and distended; this makes space for the operator's hand, and may itself effect the reposition.[1] The patient, under chloroform, is placed in the lithotomy position; pass the right hand into the vagina, and grasp the uterus with the fingers as far into the angle of reflection as possible (Fig. 231). Now press the uterus steadily upwards against the left hand on the abdomen. The fingers may be separated as far as possible so as to open out the cervix.[2]

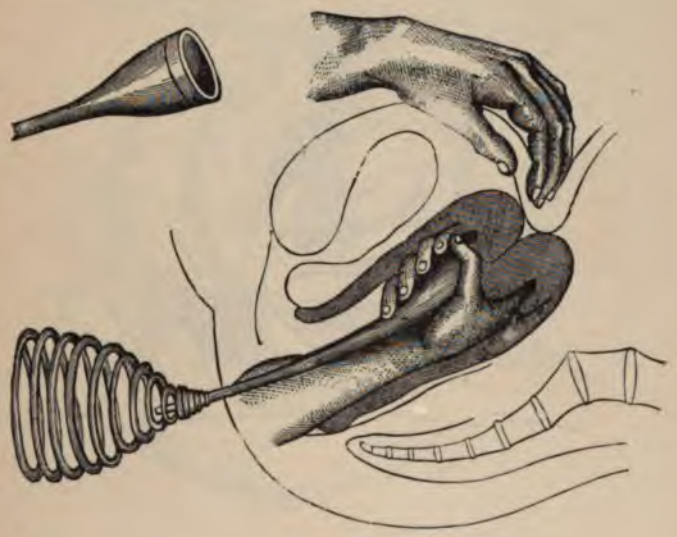

Fig. 232.

White's repositor, with elastic spring placed against the operator's chest. While the right steadies cup and uterus, counter-pressure is made with the left hand or better by an assistant (Thomas).

Sometimes the process of reinversion is started by dimpling inwards one horn of the uterus, and then forcing the depressed horn onwards as a wedge to open up the ring of the cervix.[3] As the hand cannot keep up steady pressure for any length of time, a cup is set on a curved iron rod

[1] Kroner has collected six cases of inversion (longest of eleven years' standing) replaced by this means; the pressure was applied for periods varying from one to eleven days. Archiv. f. Gyn., B. xiv., S. 270.

[2] Emmet—Op. cit., p. 424. It is very doubtful whether the constricting cervix has anything to do with preventing reposition, though upward and outward pressure round the neck favours it.

[3] Noeggerath: Am. Med. Times, 1862, vol. iv., pp. 230, 235.

with a spiral spring[1] to make the pressure equal. A curved wooden rod, with a large cup at one end and a small one at the other, has also been used to keep up pressure.[2] The end of the instrument is pressed against the operator's chest, and the cup is steadied with the hand in the vagina. It is evident that these instruments require a roomier vagina than when the hand alone is used; and if the cup slips unexpectedly it may rupture the fornix. Counter-pressure is made over the abdomen with the hand, or, if the abdominal walls are thin and there is a distinct cup on the peri-

Fig. 223.

Tait's method of making counter-pressure with fingers in bladder and rectum (Mundé).

toneal aspect, with a cone of wood[3] which is used to distend the ring of the cervix; the traction can be taken off the vaginal walls by fixing the cervix with volsella.[4] Counter-pressure may be made per rectum in the following way: Pass index and middle fingers of right hand into rectum, draw down the uterus with the left hand or the noose (Fig. 224) until these fingers get fairly above the cervix so as to press on the margins of

[1] White: Intern. Med. Cong. Trans., Philadelphia, 1876. Byrne: New York Med. Journ., Oct., 1878.

[2] Atthill: Loc. cit. Braxton Hicks: Brit. Med. Journ., Aug., 1872.

[3] Thomas: Op. cit., p. 488.

[4] Schroeder: Op. cit., S. 203. Atthill: Loc. cit.

the peritoneal depression; grasp uterus now with left hand, turning it so that the fundus is towards the symphysis and the cervix towards the sacrum; finally, make pressure with the index and thumb in the angle of reflection against the two fingers in the rectum.[1] The urethra has also been dilated so as to allow one finger to press on the anterior rim of the depression, while the rectal finger presses on the posterior.[2] To weaken the resistance of the cervix, lateral incisions have been made into its substance (Barnes; see Fig. 224).

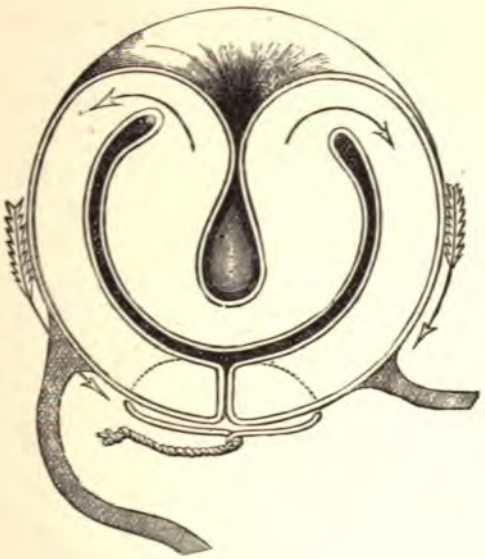

Fig. 234.

Emmet's method of retaining the partially re-inverted fundus by closing the os externum with sutures; the traction, produced in the direction of the arrows, favours re-inversion (Emmet).

This manual pressure is, with the help of assistants, to be kept up from half an hour to two hours, according to the condition of the patient. If not successful in this time, the patient is kept in bed and under the influence of opium while a Barnes bag is placed in the vagina to maintain the uterus as far as it has been replaced. When the uterus has been so far re-inverted that the fundus is above the level of the os externum, the lips of the latter may be drawn together with wire sutures.[3]

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[1] **Courty**: Maladies de l'utérus, 1866.

[2] **Tate**: Cincinnati Lancet and Observer, March, 1878.

[3] **Emmet**: Op. cit., p. 437.

Abdominal section, so as to allow the operator to get at the constricting rim of the cup from its peritoneal side and dilate it with expanding forceps, has been proposed by Thomas. It was successful in the first case; a second proved fatal from peritonitis. A. R. Simpson tried it in one case before having recourse to amputation, but could not dilate the ring.

(*b.*) *Reposition by Continuous Slight Elastic Pressure.*—If manual reposition has failed, we try the more gradual method; in some cases we em-

Fig. 233.

Cup with stem and elastic bands which are fixed to an abdominal belt, for gradual reduction of inversion (Thomas).

ploy it from the first. It is effected by the use of an air-bag, or of a wooden cup set on a stem[1] with a vaginal (or, better still, a vaginal and perineal) curve, so that the pressure is made in the axis of the brim. Pressure is made by four elastic bands which pass, two in front and two behind, to a broad abdominal bandage; by the tightening of the front or the back bands, the direction of pressure is altered.

In this method there are two points which require careful attention.

[1] Lawson Tait: Obst. Journ., vol. vi., p. 333.

(1.) The elastic pressure must always act in the line of the axis of the inverted uterus, and likewise of the axis of the pelvic brim ; the cup is apt to slip off the uterus, and the handle of the instrument to alter its direction. *Pressure in a wrong direction is injurious, and may produce sloughing.* To prevent these accidents we pad, with wadding soaked in carbolized oil, all round the neck of the inverted uterus and round the cup of the repositor when *in situ ;* we watch the position of the instrument, and remove and re-apply it every day so as to see how it is pressing and whether there is sloughing.

(2.) There must be effective counter-pressure, so as to take the strain off the vaginal walls. This is effected by means of a broad flannel bandage, firmly secured round the loins, under which cotton wool is padded in such a way as to press exactly upon the fundus.

The elastic pressure may be kept up from one to three weeks. Cases of reposition at this period, or even after it, are recorded.

In cases of inversion due to tumour growth, the tumour—if simple—must be removed in the first instance ; we then wait to see if the uterus will replace itself, and if it does not we proceed as above. If the tumour be malignant, the propriety of amputating the uterus with the tumour must be considered.

B. Amputation.

Amputation of the inverted uterus is justifiable (except in cases of malignant disease) only after all means of reposition have been fairly tried and failed, or when the uterus is extensively ulcerated and gangrenous. The length of duration of the inversion is no argument for amputation ; Noeggerath replaced one of thirteen years' standing.

The mortality in amputation is high, 1 in 3 (Crosse). The dangers of the operation are—

Hemorrhage,
Septicæmia,
Peritonitis,
Retraction of the stump into the peritoneal cavity.

We describe the operation as we have seen A. R. Simpson perform it with success.

The following are the instruments required :

Vaginal douche,
Elastic ligature,

Sims' speculum,
Spatulæ,
Volsella,
Dissecting and artery forceps,
Bistouries,
Scissors,
Long, straight, fixed needles,
Smaller curved needles and holder,
Silver wire—two thicknesses,
Carbolised silk and catgut.

Place the patient in the lithotomy posture, under chloroform. Keep up irrigation with the douche during the whole operation. Hook back the labia with spatulæ, to be held by the assistants who steady the legs; draw down the perineum with Sims' speculum, to be held by another assistant.

Ascertain before making any traction on the uterus where the natural neck of the inverted portion lies, and pass around it an elastic ligature knotted so as to control hemorrhage. The natural neck is our guide as to the line of amputation; if we drag more of the uterus down into the constricting loop, the stump is liable to spring back after the amputation has been performed.

Pass three or four wire sutures through the uterus in an antero-posterior direction, about an inch below the constricting ring, as described under the operation for amputation of the cervix (*v.* Vol. I., p. 271); the same figures will show how the sutures are passed in this operation, if we suppose the inner circle (which represents the mucous membrane of the cervical canal in Fig. 164, Vol. I.) to represent the cross-section of the peritoneal pouch. The advantages of passing these sutures before amputating are the following: they are ready *in situ* to control hemorrhage; they give us a purchase on the stump when the portion in the bite of the forceps is cut away; they are more easily passed at this stage.

The uterus is now amputated about half an inch below these sutures. Bleeding points of any size are ligatured with catgut on the end of the stump. The lips are then brought together with the deep sutures already passed. More superficial ones are placed between these to bring the mucous membrane together. The india-rubber constrictor is now notched so as to diminish its pressure, and finally cut through. The ligatures are left long enough to be brought out at the vaginal orifice, and a drainage-tube is placed in the cervical canal.

Another method is to constrict the uterus with an elastic cord which is left on for two days; this diminishes the hemorrhage on amputation. It is then cut loose, and the galvano-caustic wire or ecraseur applied in the track of the ligature.

Spencer Wells transfixed the uterus with needles, placed an elastic ligature above them, and amputated below them with Paquelin's cautery.

The old method of strangulation by ligature, with clipping away of the uterus as it sloughed off, should never be practised.

Re-inversion of the stump is a serious accident, as the raw surface now lies in the peritoneal cavity and may be a source of septicæmia; further, it is beyond our control should hemorrhage occur. In two cases of amputation with the galvano-caustic wire, performed by Spiegelberg,[1] this accident occurred: in these cases no bad result followed, because the discharge escaped by the cervical canal; he attributes this happy result to the fact that the stump-surface of the galvano-caustic wire, being a convex cone, became, on re-inversion, a concave cone opening into the cervical canal.

[1] Archiv. f. Gyn., Bd. IV., S. 358.

CHAPTER XXXIII.

FIBROID TUMOURS OF THE UTERUS; PATHOLOGY AND ETIOLOGY.

LITERATURE.

Barnes—Op. cit., p. 746. *Duncan, Mathews*—Edin. Med. Jour., Jan. and Feb., 1867. *Gusserow*—Die Neubildungen des Uterus: Stuttgart, 1878. *Klob*—Op. cit., S. 149. *M'Clintock*—Diseases of Women: Dublin, 1863. *Routh*—Fibrous Tumours of the Womb: London, 1864. *Schroeder*—Op. cit., S. 206. *Simpson, Sir J. Y.*—Op. cit., p. 659. *Thomas*—Op. cit., p. 519. *Winckel*—Ueber Myome des Uterus, &c.: Volkmann's Sammlung klin. Vorträge, No. 98, 1876.

Synonyms.—Myoma or Fibromyoma Uteri; Fibrous Tumour; Tumeur fibreuse; Hystérome.

As this tumour is composed of both the connective-tissue and muscular elements of the wall of the uterus, it is at once a fibroma and a myoma; the most correct term therefore is *fibro-myoma*. In the majority of cases, however, the fibrous tissue preponderates, so that the tumour resembles a fibroma; the English term fibroid (a term derived from the root of fibroma and εἶδος=like a fibrous tumour) is therefore not inappropriate, and is also more convenient.

PATHOLOGY.

Under this head we shall describe their—

Situation;
Structure—naked-eye and microscopic;
Mode of growth, varieties;
Changes in uterus;
Degenerative changes.

SITUATION.

They occur much more frequently in the body of the uterus than in the cervix; of seventy-four cases of fibroid tumours recorded by Lee, only four were in the cervix. In the body of the uterus the most common

seat is *the posterior wall;* they occur less frequently in the anterior wall, and very rarely at the sides of the uterus. The soft, truly muscular, form is most commonly situated at the fundus.

STRUCTURE.

They are composed of the same elements as the muscular wall of the uterus, viz., of non-striped muscular fibre and fibrous tissue. These are both present in every case, hence the correct name for these tumours is fibro-myoma. The proportion of these constituents, however, varies; in some rare cases the muscular tissue preponderates, producing a true

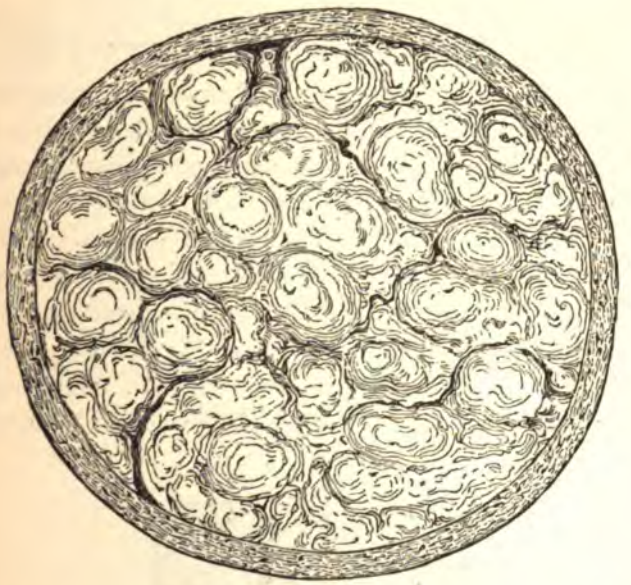

Fig. 236.

Section of a large fibroid tumour, with the fibres arranged round several centres (Sir J. Y. Simpson).

myoma which is not circumscribed and grows rapidly; more usually there is excess of fibrous tissue producing a *fibro-myoma*, which is distinctly marked off from the wall of the uterus and grows slowly. The naked-eye characters of the myoma are those of a flesh-coloured tumour having a soft consistence, passing gradually into the surrounding uterine wall, and usually single. The fibro-myoma, by far the most frequent form, is of firm consistence, which makes it feel like a foreign body in the softer muscular wall; it is of a pale colour, resembling fibrous tissue; it cuts

like cartilage, the cut surface having a glistening satinlike appearance and being often uneven through the firmer fibrous tissue forcing out the softer parts between ; the bundles of fibrous tissue have a concentric arrangement round one or more centres (Fig. 236). The tumour is surrounded by loose fibrous tissue, which with the immediately adjoining muscular

Fig. 237.

Section of fibroid tumour, showing wavy bundles of fibrous tissue ($^1/_1$) (Gusserow).

layer constitutes the so-called *capsule ;* it has a broad connection at one point with the muscular tissue of the wall, or becoming entirely detached from it lies free in its capsule. This looseness of the tissue round the tumour is important in relation to its removal by the process described as *enucleation.* Few blood-vessels penetrate into the substance of the tumour, although the tissue immediately round it is very vascular and often contains enlarged veins which resemble the venous sinuses of the pregnant uterus (Fig. 246) ; nutrition is apparently effected by transudation from the capsule. In some rare cases, however, these tumours possess a cavernous structure consisting of dilated blood-vessels. Virchow has de-

Fig. 238.

Section of fibroid tumour, showing spaces between bundles of fibrous tissue ($^1/_1$) (Gusserow).

scribed this form as "Myoma teleangiectodes seu cavernosum ;" cases are recorded by Leopold and Schroeder.

On microscopic examination, the myomatous form has the appearance of muscular fibre of the uterus. The fibromatous form (common fibroid tumour) has the appearance shown at Fig. 237, in which the wavy bundles

of fibrous tissue are well seen. Sometimes the bundles of fibrous tissue are separated by spaces (Fig. 238), which Klebs considers to be lymphatic spaces. Nerves have been traced into the substance of these tumours by Lorey; but, as an interesting case recorded by Freund shows, they are not sensitive—a submucous fibroid was extruded beyond the vulva; the lower third, which protruded beyond its capsule of mucous membrane, was not sensitive to the prick of a needle; the upper two-thirds, from their being still covered by *mucous membrane*, were very sensitive.

MODE OF GROWTH, VARIETIES.

All fibroid tumours are, in the beginning, interstitial or intra-mural. As they increase in size they expand in the substance of the wall or towards one of the free surfaces (peritoneal or mucous), thus becoming subperitoneal or submucous. Hence three varieties are recognized—*interstitial*, *subperitoneal*, and *submucous*. It is evident that these terms are relative, as it is difficult to say when an interstitial fibroid becomes submucous. Gusse-

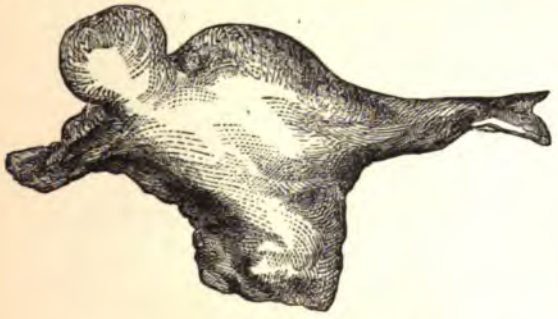

Fig. 239.

Pediculated sub-peritoneal fibrous tumour (Sir J. Y. Simpson).

row limits the term "submucous" to *pediculated* submucous, and "subperitoneal" to *pediculated* subperitoneal fibroids. A submucous tumour, however, often gives rise to the clinical signs diagnostic of the submucous variety long before it becomes pediculated. Each variety requires short description. For the sake of convenience, we describe the fibroid tumours found in the body of the uterus; the comparatively rare fibroid tumours of the cervix are best noticed separately (p. 89).

A. The subperitoneal grow outwards into the peritoneal cavity. The thickness of the pedicle varies (compare Fig. 239 with Fig. 240); its length determines the mobility of the tumour. When the tumour attains

a certain size, one of two things happens. (1.) It may grow up into the abdomen and expanding there draw the uterus forcibly upwards, producing by this traction elongation of the cavity (Fig. 240) with thinning of the walls. An interesting case is recorded by Times[1] in which the cavity of the body of the uterus was elongated to six inches; the cervical canal extending only one inch inwards from the os externum, ended blindly at a

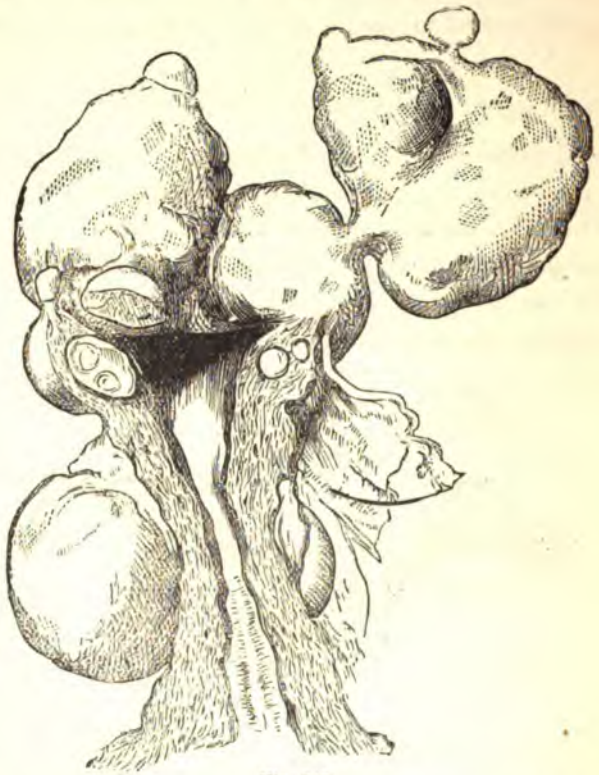

Fig. 240.

Uterus with elongated cavity due to the presence of several fibroid tumours (Sir J. Y. Simpson).

point two inches distant from the beginning of the cavity of the body; the intervening portion was obliterated so as to form a solid muscular cord. Virchow says that the body may even be torn from the cervix by forcible traction. (2.) The tumour, growing from the first within the pelvis, may through pressure produce the symptoms of incarceration; or, having a long pedicle, may fall down from the abdomen into the pelvis and produce similar symptoms. The point of origin of the tumour and the length of

[1] London Obst. Trans., vol. ii., p. 34.

the pedicle determine whether these symptoms can be relieved by pushing the tumour out of the pelvis. Twisting of the pedicle occurs less frequently in fibroid than in ovarian tumours; when it occurs, it leads to œdema or gangrene. Schroeder[1] mentions a case where, on operating, he found the tumour distended with blood from partial twisting of the pedicle. Gangrene of the tumour, leading to a fatal peritonitis, was observed by Cappie;[2] the pedicle was twisted round its axis one and a half times. Adhesions form with other organs, as occurs with all abdominal tumours; these may become new sources of nutrition. Sometimes they lead to detachment of the tumour from the uterus: the tumour is anchored, as it

Fig. 241.

Interstitial fibroid tumour (Sir J. Y. Simpson).

were, to the abdominal walls; and, when the uterus from pregnancy or other causes becomes displaced, the pedicle gives way. Turner[3] reports a case in which a small calcareous fibroid was found free in the pouch of Douglas; a second was attached to the posterior wall of the bladder and to the pelvis; a third was bound down to the bladder and the pelvic wall by adhesions, but still retained its connection with the uterus by a thin pedicle. Adhesions to the intestines have produced symptoms of intestinal

[1] Op. cit., S. 218.

[2] Obstetrical Journal. ii., p. 303.

[3] Edinburgh Medical Journal, 1861, p. 698.

obstruction.[1] Hernial protrusion of the abdominal walls has been described by Düll:[2] he reports two cases of this very rare occurrence; in one case, the skin covering the hernial sac became gangrenous, so that the tumour lay exposed.

B. The Interstitial remain in the substance of the uterine wall, and do not become pediculated. The appearance of such a tumour is well seen at Fig. 241. Usually there are many such tumours present (Fig. 240); Schultze counted as many as fifty in one uterus, and Thomas describes the uterus of a negress containing thirty-five.

C. The Submucous are the most important clinically. They lie imme-

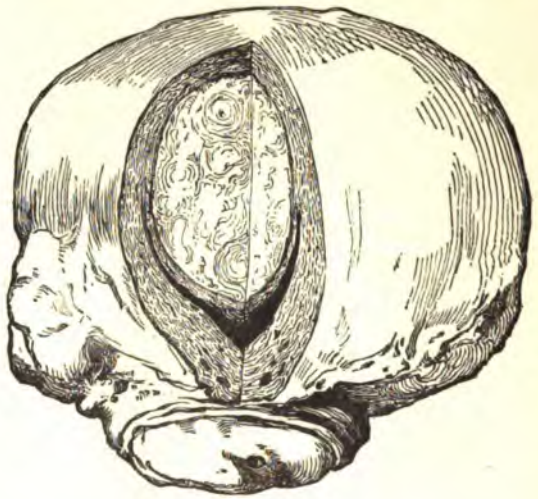

Fig. 242.

Submucous fibroid tumour projecting into uterine cavity (Sir J. Y. Simpson).

diately underneath the uterine mucous membrane, and project into the cavity of the uterus (Fig. 242). They are attached along a broad base, or by a pedicle; when they hang free, they are known as fibrous polypi (the most frequent form of uterine polypi, to be described in a separate chapter). When a fibroid tumour projects into the uterine cavity, it acts as a foreign body and produces uterine contractions. These lead, in some instances, to *pedunculation* of the tumour and even to its extrusion from the uterine cavity; in such a case, it hangs as a polypus into the vagina. In other rare cases, the capsule ruptures and the liberated tumour is expelled piecemeal—*spontaneous enucleation.*

[1] Eade: Lancet, December 21, 1872. [2] Cited by Schroeder, op. cit., S. 221.

CHANGES IN THE UTERUS.

The *muscular wall* hypertrophies, more especially when the tumour is submucous or interstitial. A small fibroid lying in the lower segment of the uterus has caused the whole organ to hypertrophy to the size of a child's head.[1] In submucous fibroid, the *mucous membrane* is also hyper-

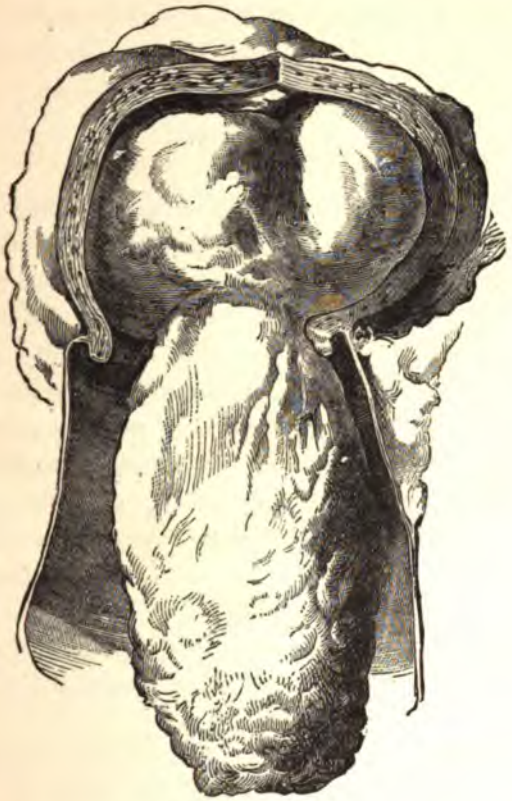

Fig. 243.

Pedículated submucous fibroid in process of extrusion (Sir J. Y. Simpson).

trophied; over the surface of the tumour, it may form adhesions or may ulcerate. The changes in the structure of the uterus generally thus resemble those of pregnancy and have been described by French writers as "Une grossesse fibreuse." *Changes in the position* of the uterus have been already referred to; when subperitoneal fibroids rise up into the abdo-

[1] Tillaux: Gaz. des Hôp., 1867, No. 144.

men, it is sometimes drawn forcibly upwards by them and may be twisted on itself.[1] At other times the weight of a subperitoneal or interstitial tumour leads to prolapsus uteri. Inversion of the uterus is also occasioned by submucous fibroids when these are situated near the fundus and when their pedicle does not admit of extrusion as polypi.

DEGENERATIVE CHANGES.

These are the following :—

Softening,
Induration,
Calcification,
Suppuration.

The softening may be due to œdema, to fatty degeneration, or to myxomatous degeneration. The occurrence of the œdema is unquestioned, and many cases of sudden increase in the size of fibroid tumours may be thus explained. From analogy with the changes affecting muscular fibre in the puerperal uterus, we should expect fatty degeneration to occur ; there is, however, only a small quantity of muscular tissue present in these tumours. There are only two cases[2] recorded in which the existence of fatty degeneration has been demonstrated by microscopic examination, although many cases are reported in which this is supposed to have occurred. Myxomatous degeneration, resulting in the formation of spaces containing mucus between the layers of the tumour, sometimes occurs.

Induration, with atrophy or shrinking of the tumour, occurs in some cases after the menopause. The muscular tissue fattily degenerates and disappears, the fibrous tissue contracts.[3]

When calcification occurs, lime salts (chiefly phosphates) are deposited in the fibrous tissue and produce the so-called womb-stones. This deposit usually commences in the centre of the tumour and extends outwards, more rarely in the external layers so as to form a shell round the tumour. Sometimes it is so extensive that the tumour can be cut with the saw, and the cut surface polished ; more usually it is incomplete, and forms a coral-

[1] As in the case reported by Küster : Beiträge zur Geb. u. Gyn., 1871, Bd. i., S. 7. The uterus was twisted two and a half times, so that the broad ligaments formed a spiral.

[2] Gusserow : Loc. cit., S. 31. The cases are reported by Freund and Martin.

[3] Sir J. Y. Simpson : Obst. Mem., p. 115.

like skeleton. Calcification affects only subperitoneal and interstitial fibroids. Calcification of portions of the tumour is often accompanied with suppuration in others, probably from interference with nutrition.

Suppuration occurs frequently in submucous fibroids, as the result of injury from operative interference or from constriction of its pedicle during the process of expulsion. It has also been observed as a rare occurrence in subperitoneal fibroids, accompanying calcification or from torsion of the pedicle. In such a case, the tumour either finds its way through the abdominal walls or fatal peritonitis follows.

Whether *carcinomatous* degeneration specially affects fibroid tumours, is a disputed point. We occasionally find carcinomatous degeneration in a uterus where a fibroid tumour is also present (Fig. 273) or from which a polypus has on a former occasion been removed. Whether this is merely a coincidence, or whether there is a liability that the non-malignant tumour may become the seat of malignant disease, is not settled. The practical importance of this question is evident.

FIBROID TUMOURS OF THE CERVIX.

The occurrence of fibroid tumours in the cervix is rare; but, when they are present, they often give rise to difficulty in diagnosis on account

Fig. 244.

Cervical polypus springing by a fibrous pedicle from the region of the os internum, and pushing itself under the whole mucous membrane of the cervical canal; so that its insertion is partly continuous with the tissue of the uterus, partly truly submucous. Between these a cavity has formed, through tearing of the mucous membrane, so that the tumour has apparently two pedicles (Schroeder).

of the distortion which they produce. They spring from either wall, and grow outwards towards the peritoneal cavity or downwards into the cellular tissue beside the vagina. When subserous, they easily produce symp-

toms of incarceration, as, from their low position, they are liable to becon wedged in the pelvis. When submucous, they produce elongation of on lip and may form a polypoidal tumour in the vagina (Fig. 244) ; the ac companying distortion of the os externum leads to difficulty in diagnosis. Cases in which a large tumour bulges through the ostium vaginæ have been mistaken for inversion and prolapsus. Sometimes, prolapsus is due to the weight of the tumour and disappears after its removal.[1] The interstitial form is easily mistaken for inversion when the os is converted into a transverse cleft which escapes observation and the unaffected lip is thinned out to a mere band.

ETIOLOGY.

Gusserow, to whose exhaustive article—Die Neubildungen des Uterus—in Billroth's Handbuch we are greatly indebted in this chapter, says in regard to etiology, "Ueber die Ursachen der Uterus-myome wissen wir so wenig, wie über die Ursachen der meisten pathologischen Neubildungen, nämlich *nichts*" (of the causes of fibroid tumours we know as little as of the causes of most pathological new formations, that is *nothing*). Virchow and Winckel have both made elaborate attempts to assign a cause to the development of fibroid tumours. The number and variety of causes adduced by these observers only show how far we are from the knowledge of the real cause ; with such a variety of causes, the difficulty would not be to explain why they are present in some but why they are not present in every case.

They are without doubt the most frequent new formation in the uterus. Klob says that they are present in 50 per cent. of women who die over fifty years of age ; and Bayle, in 20 per cent. of those who die over thirty-five years ; both of these estimates are probably beyond the mark.

Their development is in some way related to the development of the sexual apparatus. Thus, there are no well-authenticated cases of their arising before puberty or after the menopause. The majority of patients are between the ages of thirty and forty when they first seek medical advice, as is evident from the accompanying table based on statistics collected by Gusserow (Fig. 245). Schroeder says that of 196 patients, who during three years of his private practice consulted him for fibroid tumours, 104 were between forty and fifty, and 62 between thirty and forty.

[1] Barnes: Obst. Trans., iii., p. 211.

Sexual activity predisposes to their development as they are almost twice as frequent in married as in unmarried women ; of 959 cases collected by Gusserow, 672 were married women. It is important to note this, as it was formerly supposed that single life favored their development. As the presence of a fibroid tumour interferes with conception, we often find sterility present.

NUMBER OF CASES.

Out of 919 cases			15	were	below	20	years.	
"	"	"	156	were	between	20	and	30 years.
"	"	"	357	"	"	30	"	40 "
"	"	"	338	"	"	40	"	50 "
"	"	"	36	"	"	50	"	60 "
"	"	"	12	"	"	60	"	70 "
"	"	"	5	"	above	70	years.	

(Gusserow.)

PERCENTAGE PROPORTION.

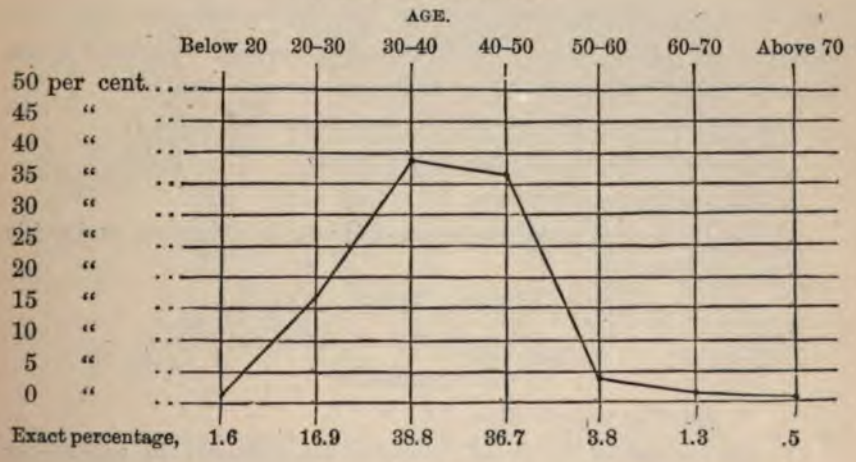

Fig. 245.

Table and diagram showing frequency of fibroid tumours according to age of patient.

CHAPTER XXXIV.

FIBROID TUMOURS OF THE UTERUS; SYMPTOMS, DIAGNOSIS, PROGNOSIS.

LITERATURE.

See Literature of Chapters XXXIII. and XXXV.

LIKE other pathological conditions of the uterus, fibroid tumours sometimes produce no symptoms and their presence is discovered accidentally or on *post-mortem* examination. This absence of symptoms is more likely to occur should the tumour be small, or should there be no sexual activity as in unmarried women. In the latter case, although symptoms appear only when the patient enters married life, the tumour may have been already a long time present. Subperitoneal tumours, even when large, may only produce discomfort from undue abdominal distention.

The symptoms usually present may be tabulated as follows:

1. Menorrhagia, irregular hemorrhages;
2. Painful menstruation;
3. Pelvic sensations due to size and weight of tumour, peritonitic pain;
4. Symptoms of pressure on bladder and rectum,
   blood-vessels and nerves,
   ureters;
5. Sterility and abortion.

1. *Hemorrhage* is the most characteristic symptom in submucous fibroids, and appears first as a *gradual increase* of the normal menstrual flow; it never begins with a sudden flooding, as in carcinoma uteri. In *menorrhagia*, the hemorrhage comes from the hypertrophied mucous membrane of the uterine cavity generally; it does not come from the mucous membrane covering the surface of the tumour, which is frequently thinned and atrophied, nor from the substance of the tumour itself, which as we have seen is sparingly vascular. When, however, the submucous

fibroid projects as a polypus, passive congestion and hemorrhage from the mucous membrane covering it may be occasioned by the constriction of its pedicle. *Irregular hemorrhages* arise from ulceration of the mucous membrane covering the tumour, or rupture of the dilated veins in its capsule. Fig. 246 shows a case[1] in which, through the rupture of a uterine

Fig. 246.

Uterus containing fibroid tumour, from a case which terminated fatally through hemorrhage. Note the large venous sinuses in the capsule, one of which ruptured at the point *a* (Mathews Duncan).

sinus in the lower part of the tumour, a sudden and fatal hemorrhage occurred. In subperitoneal fibroids menstruation is not increased, and in certain rare cases is diminished.

2. *Pain* accompanies *menstruation*. In the submucous variety there

[1] Reported by Mathews Duncan: Edin. Med Journ., 1867, p. 634. He also refers to a case of Cruveilhier's in which death was occasioned in the same way.

is often characteristic uterine *dysmenorrhœa*, in which the pain resembles labour pains. The congestion causes the polypus to swell, and this produces uterine contractions (*v.* Uterine Polypi). In interstitial and even in subserous fibroids, there is often pain at the menstrual period which cannot be thus explained. In subserous fibroids with a pedicle containing large vessels, as well as in interstitial, Gusserow ascribes the pain to the distention of the tumour with blood. This pain is of a stretching or dragging nature, and is quite different from the pain of uterine contractions.

3. *Increased weight* of the uterus occasions *sensations* of discomfort, which are described as "fulness or weight in the pelvis," "a sensation of dragging," "bearing-down pain." When the tumour is so large that it fills the pelvis and becomes wedged in it, intense pain is produced; this is either always present, or recurs only at the menstrual periods when the tumour is distended by blood. As in carcinoma uteri, peritonitic pains —indicated by local tenderness and reflex contraction of abdominal muscles—may arise at any time from secondary chronic peritonitis. Neuralgic pain is sometimes present locally (see below), but may be also through the whole body.

4. Frequency of micturition, due to *pressure on the bladder*, is the most common pressure symptom. *Pressure on the urethra* produces difficulty of micturition and even retention; with some patients, this recurs regularly at the menstrual period. Even very small fibroids, when they are situated in the anterior uterine wall, may press *on the neck of the bladder* and produce symptoms of cystitis. *Pressure on the rectum* by fibroids in the posterior wall occasions constipation or, more rarely, mucous diarrhœa. Incarcerated fibroids have produced complete obstruction and led to a fatal result,[1] or furnished an indication for colotomy. Intestinal obstruction has also resulted from adhesions between the tumour and the small intestine.[2] *Pressure on the veins* produces hæmorrhoids and varicose veins in the legs. Interesting cases of neuralgia due to pressure on *pelvic nerves* have been recorded. In these cases the neuralgia entirely disappeared as soon as the tumour was lifted up and supported by a pessary.[3] Compression of *the ureters*, with consequent dilatation and hydronephrosis, occurs less frequently in fibroid tumours than in carcinoma. The reason for this

[1] Holdhouse: Lond. Path. Soc. Trans., III., 371.

[2] Eade: Lancet, Dec. 21, 1872.

[3] Kidd: Dub. Quart. Journ., 1872. Jude Hüe: Annales de Gyn., IV., p. 239.

is evident; in carcinoma the compression is due to infiltration of the tissue round the ureter, which from the anatomical relation of the ureters to the cervix easily occurs; fibroid tumours in their growth simply press against the ureters, and may push them aside. Several cases of single and double hydronephrosis and of death from uræmia,[1] have been recorded. Bright's disease has developed secondarily.[2] In fibroid tumours, where pressure symptoms are present, we should always examine the urine.

5. *Sterility* is frequent. Of 149 cases of married women collected by Schroeder, 33 per cent. were sterile and the average number of children to each mother was about three. When conception occurs, fibroid tumour may lead to abortion or complicate labour.

PROGRESS AND RESULTS.

A relative cure usually takes place at the menopause, when the tumour ceases to grow. In the case of subserous tumours, this may happen even before that time.

Spontaneous disappearance of the tumour has been observed in certain cases, although nothing definite is known as to the means by which it is effected. After sifting the reported cases, Gusserow's conclusion is that there are thirty cases in which this undoubtedly occurred.[3] Out of these thirty, thirteen were associated with the puerperium and the rest chiefly with the menopause. We might account for their disappearance during the puerperium by a process analogous to involution. Of the reason of the disappearance at the menopause we know nothing.

Complete cure also results from *spontaneous expulsion.* This occurs in three ways :—

(1.) By pediculation and extrusion of the tumour as a polypus (*v.* under Uterine Polypi);

(2.) By enucleation, in which the tumour is shelled *en masse* out of its bed;

(3.) By the breaking down of its substance and consequent expulsion in fragments.

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[1] Gusserow quotes cases from Jude Hüe, Murphy, Hanot: Neubildungen, etc., S. 47.

[2] Hubert: Bull. de la Soc. Anatom., 1873, p. 870.

[3] He does not refer to a case observed by A. R. Simpson, and probably others have been overlooked.

Enucleation occurs in submucous and also in interstitial tumours. The mucous membrane of the capsule ulcerates, and the tumour is thus exposed; partly through suppuration, partly through uterine contractions, it becomes detached all along the line of its capsule and, being thus liberated, is expelled. This process is comparatively safe for the patient, though there is always the risk of hemorrhage from the large veins in the capsule (Fig. 246). In spontaneous enucleation, suppuration does not occur in the tumour itself, but only in its capsule.

The *breaking down* of the substance of the tumour is a much more dangerous process for the patient. As it is a slow one, there is risk of absorption of septic matter. The commencement of this change is indicated by increase in the size of the tumour, which becomes tense and painful to the touch. There is a purulent fetid discharge from the vagina, and sometimes hemorrhage. The constitutional symptoms of loss of appetite and hectic fever afterward develop, and most of such cases end fatally.

Expulsion of the tumour generally takes place per vaginam. As in other tumours we have inflammatory adhesions forming with neighbouring organs, followed by suppuration and perforation by the tumour. Thus calcified fibroids have perforated into the bladder, and have been mistaken for vesical calculi.[1] A fibroid has perforated into the rectum, and has been discharged per anum. In some cases adhesions with the abdominal wall have formed, and the tumour has been thus discharged.

Considering the frequency of fibroid tumours, it is rare that *death* follows immediately from their presence. A fatal result, however, may follow from (1) suppuration in the tumour, producing death from septicæmia, or a septic peritonitis; (2) uræmia, due to compression of the ureters; (3) direct hemorrhage; (4) acute simple peritonitis.

PHYSICAL SIGNS; DIFFERENTIAL DIAGNOSIS.

The physical signs of fibroid tumours are usually so well marked that diagnosis is easy. In certain cases, however, diagnosis is very difficult; and when inflammation is superadded, certainty is impossible. Physical diagnosis is best considered under two heads: *A*, of small fibroid tumours up to the size of a walnut or egg; *B*, of larger ones, which rise up as a distinct tumour unto the abdomen.

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[1] M'Clintock: Dub. Quart. Jour., Feb, 1868.

A. OF SMALL FIBROID TUMOURS.

1. Pediculated *submucous* fibroids should be easily recognised. When they are small and not projecting through the os, we have to dilate the cervix to ascertain their presence and attachment; when larger and projecting into the vagina, they may readily be mistaken for inversion of the uterus. On sweeping the finger round the base, we recognise the commencement of the cervical canal, unless the polypus be adherent at its neck, leading to obliteration of the canal (*v.* Fig. 227). Further, the bimanual or rectal examination shows the fundus uteri to be in its normal position.

2. Small *interstitial* fibroids when situated *low down* and causing bulging of one lip of the cervix, give rise to difficulty; owing to the great enlargement of one lip, the os is displaced to the other side and its form altered to that of a mere slit which easily escapes observation. Such cases have been occasionally mistaken, even by the most experienced, for inversion. This mistake is prevented by examination per rectum. Further, the sides and base of the tumour must be carefully scrutinized to discover the os; when this is found, the sound will show the position of the uterine cavity.

3. *Interstitial* fibroids placed *high up* in the uterus, or small *subserous* ones with a *broad base* of attachment, often escape detection. To ascertain their presence we proceed as follows. Pass the sound; this defines the course of the uterine canal and position of the fundus. Now make the bimanual examination with the sound, as represented in Fig. 97, Vol. I.; the finger in the anterior fornix detects the thickening of the anterior wall, produced by a small fibroid. Now steady the sound with the left hand, and pass the forefinger of the right hand into the rectum so as to feel the sound lying in the uterus. Should there be a fibroid in the posterior wall, the finger recognises an unusual thickness of tissue between it and the sound. Carry the sound, firmly grasped by the left hand, towards the symphysis, so as to bring the fundus better within reach of the rectal finger; and, by moving it from side to side, ascertain whether the tumour is intimately connected with the uterus so that it moves along with it. From their being largely composed of fibrous tissue, these tumours are firmer than the uterine wall; the *localised hardness*, therefore, helps us in recognising them.

Small fibroid tumours require to be diagnosed from
Chronic metritis,
Early pregnancy,
Ante- and retro-flexion.

In *chronic metritis* the uterus is not globular but flat, and the enlargement is equable; the uterine canal is patulous; the os is everted, and shows catarrhal patches. We must remember that chronic metritis is occasionally present along with a fibroid tumour.

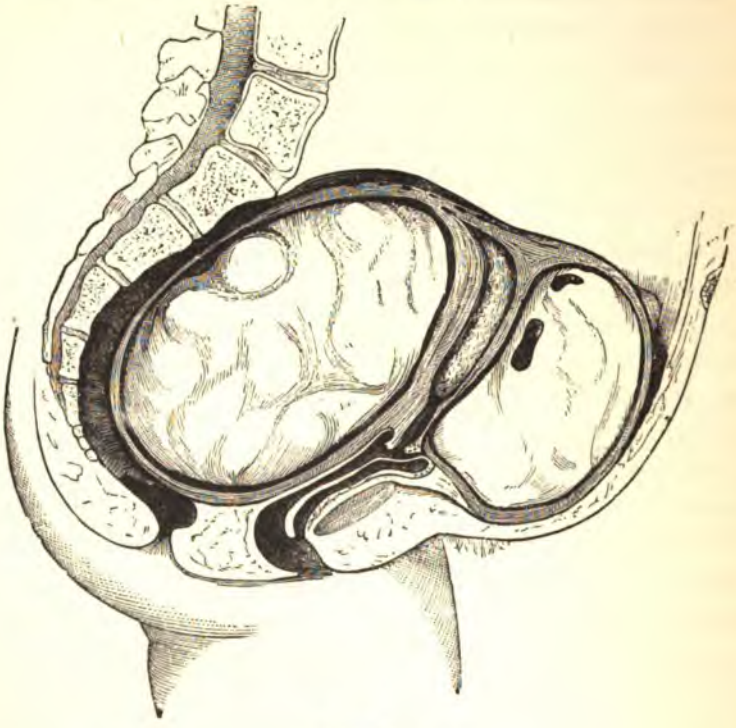

Fig. 247.

Case of two and a half months' pregnancy associated with two large fibroid tumours—one in the anterior, the other in the posterior wall. The uterus and tumours were removed by laparotomy (Barnes).

In *early pregnancy*, the uterus is soft and elastic; the cervix is generally softened, while in fibroids it remains hard. Pregnancy, however, may occur in a uterus which is already the seat of a fibroid tumour (Fig. 247); and in such a case the diagnosis becomes certain only after the uterus is considerably enlarged. The possibility of pregnancy must specially be kept in mind here, as we involuntarily think of using the sound to aid in detecting fibroids.

Anteflexion is closely simulated by a fibroid in the anterior wall; a body is felt in the anterior fornix, continuous with it, but separated by a groove. Similarly, a fibroid in the posterior wall has all the characters of the *retroflexed fundus*. Examination by the sound (*v.* Fig. 198), and especially by the sound plus the bimanual, clears up the case.

B. OF LARGE FIBROID TUMOURS.

When the tumour extends into the abdomen, we proceed with the systematic examination as described in Vol. I., page 95.

Palpation: The tumour has a well-defined outline, and a firm solid consistence. It is intimately connected with the uterus; this is best ascertained by laying hold of the cervix with the volsella, when the cervix will be found to move along with the abdominal tumour. Subserous fibroids have a certain range of free movement, depending on the length of the pedicle. *Percussion:* The note is absolutely dull, unless intestines come between the tumour and the abdominal wall. *Auscultation:* The uterine souffle is heard most distinctly at the sides, sometimes all over the tumour. As the uterine souffle simply means enlarged uterine arteries, there is no souffle when these are not enlarged; hence it is absent in subserous fibroids with a small pedicle. *Vaginal examination:* Should the tumour be large and lifting the uterus into the abdomen, the cervix will be high up; or it may be displaced in various ways, according to the position of the tumour; it has a firm consistence. *Bimanual:* With pediculated subserous fibroids, the uterus is felt distinct from the tumour; with interstitial and submucous, we simply feel a large mass continuous with the cervix. *The Sound:* This should not be used till all possibility of pregnancy has been excluded. In doubtful cases, we wait three or four months till the positive signs indicative of pregnancy should have had time to develop. From the use of the sound we learn (1) the length, (2) the direction of the uterine cavity. The length of the cavity is always increased in submucous, and generally in interstitial, but not in subserous tumours; it may measure six or eight inches. The direction of the canal is often tortuous in submucous; hence the passage of the sound is difficult, sometimes impossible. We feel that the sound goes so far and then catches on a hard projection. In such cases, a soft (No. 8) bougie is very useful, as its flexibility allows it to pass the obstruction. Usually, the sound passes to only one side of the tumour; sometimes we

can sweep it more or less round the tumour, showing that it projects free into the uterine cavity (Fig. 248).

Large fibroid tumours require to be diagnosed from—

Advanced pregnancy,
Ovarian tumours;

Extra-uterine gestation,
Hæmatocele and inflammatory deposits.

In *advanced pregnancy* the uterus is of softer consistence, and shows ballottement—the indication of a solid within a fluid; further, we can feel

Fig. 248.
Sound used to detect pediculated submucous fibroid (Leblond).

the parts of the fœtus. It becomes occasionally harder under the hand, especially if we make the patient change her position; this *variation in consistence* is a most valuable diagnostic, as it is rarely present in fibroid tumours. We hear the uterine souffle and, unless the child be dead, we hear in addition the *fœtal heart;* the possibility of the child's being dead should always be kept in mind. On vaginal examination, there is discoloration of the vaginal walls with free secretion; the cervix is softened. There is usually amenorrhœa corresponding in duration to the size of the uterus.

Ovarian tumours are soft and elastic; small ones may be firm. There is no uterine souffle. They only give rise to difficulty in diagnosis when they have become adherent to the uterus, and move along with it. It is sometimes impossible to diagnose between them and cystic fibroid tumours (*v.* Fibro-cystic Tumours).

Extra-uterine gestation presents great difficulty in diagnosis, but we delay its consideration till the chapter on that subject (*v.* Section IX.).

In *hæmatocele and inflammatory deposits* we have the history of the attack to guide us. It may be impossible to form a diagnosis on first examination; but after watching the case for a few weeks and noting any change in the deposit in addition to ascertaining its precise situation, we can form a diagnosis. Pelvic peritonitis frequently occurs round a subperitoneal fibroid, or any fibroid producing pressure; and in such a case it is impossible to diagnose between the tumour and the effusion round it. Many cases reported of gradual absorption of a fibroid tumour under treatment, were probably cases of mistaken inflammatory exudation.

PROGNOSIS.

In forming our prognosis we must take into account (1) the site of the tumour in the uterus, most favourable when subserous; (2) its position in the pelvis, whether low down and likely to become wedged within it; (3) the symptoms already present, of which hemorrhage is the most important. Though (as already said) they are rarely dangerous to life, they may cause the patient many years of suffering, from which she only finds relief at the menopause.

CHAPTER XXXV.

FIBROID TUMOURS OF THE UTERUS—TREATMENT.

LITERATURE.

Atlee—The Treatment of Fibroid Tumours of the Uterus: Internat. Med. Cong. Trans., Sept., 1876. *Duncan, Mathews*—Clinical Lectures: London, 1879, p. 158. *Greenhalgh*—On the Use of the Actual Cautery in the Enucleation of Fibroid Tumours of the Uterus: London Med. Chirurg. Trans., Vol. LIX. *Hegar u. Kaltenbach*—Die operative Gynäkologie: Stuttgart, 1881, S. 416. *Leblond*—Traité élémentaire de Chirurgie gynécologique: Paris, 1878. *Palmer*—Laparotomy and Laparo-Hysterotomy, their Indications for Fibroid Tumours of the Uterus: Americ. Gyn. Trans., 1880, p. 361. *Simpson, A. R.*—The Treatment of Fibroid Tumours of the Uterus; Contributions to Obstetrics and Gynecology, Edinburgh, 1880. *Sims, Marion*—On Intra-uterine Fibroids: New York Medical Journal, April, 1874. *Wells, Spencer*—British Medical Journal, May and December, 1878. See also references in the text.

This is best considered under the heads of medical and surgical treatment.

A. MEDICAL TREATMENT.

There is no medicine which acts immediately upon fibroid tumours so as to cause disintegration and absorption. We have, however, a very important remedy in *ergot of rye;* the beneficial effects of this have been brought forward by Hildebrandt,[1] and by A. R. Simpson, whose paper on the treatment of fibroids may be consulted for illustrative cases. It acts beneficially in two ways—by checking their nutrition through diminishing the amount of blood circulating to them, and by favouring their pedunculation and expulsion; these are both due to its action on the unstriped muscular fibre of the walls of the uterus and coats of the blood-vessels. Success in its use depends, according to Simpson, on securing that the preparation of ergot used be active, that it be properly administered, and

[1] Berlin. klin. Wochenschrift, 1872, No. 25.

that the case be a suitable one. The formula for the preparation which he recommends is—

℞. Ergotinæ..... ʒ ii.
Aquæ..... ʒ vi.
Chloral-hydratis..... ʒ ss.
M.

Three grains of ergotin are contained in twelve minims of the fluid, which is a good medium dose. Chloral is added to make the solution keep; but even with this it becomes after some weeks unfit for use, and should therefore be made up repeatedly and in small quantities. It is administered with the ordinary hypodermic needle. Care must be taken that the syringe contains no air: this is best secured by holding it with the needle upwards and squirting out some of the liquid. The injection is made in the gluteal region, which is readily done when the patient is lying on her side, and on the right and left sides alternately, so as to diminish the frequency of punctures in the same region. Enter the needle vertically and plunge it rapidly *deep into the muscle*, the point entering to the depth of from an inch to an inch and a half; now empty the syringe, and quickly withdraw the needle. After use, remember to cleanse the needle with water and to replace the wire in it. The patient soon becomes accustomed to the prick of the needle, and, if it be entered deeply into the muscle, there is little fear of local suppuration; after three years' experience we have seen this in but one case, and this was probably due to a bad preparation of the solution. For the first few weeks the injections may be made twice a week, afterwards only once a week. The treatment is continued for several months until its effect is seen in diminution of the size of the tumour or, at least, of the hemorrhage from it. The suitable cases are those in which the tumour is intramural or submucous; "it must be surrounded by layers of muscular fibre, sufficiently developed to be capable of being excited to contraction."

When the patient cannot be seen frequently by a physician, a friend or a nurse should be instructed how to apply the needle. Ergot can also be administered in the form of pill, suppository (4 gr. in each), or liquid extract (30 drops thrice daily). When given by the mouth, however, it does not act so quickly or surely as when given hypodermically.

Bromide of potassium was recommended by Sir J. Y. Simpson, who believed that it had a marked influence in checking the growth and even in

reducing the size of fibroid tumours. It is impossible to say whether, in cases where the tumour diminished in size during its administration, this result was due to the bromide. As a prolonged use of the bromide is generally necessary, small doses (ten grains, three times a-day) should be administered. Being a nervine sedative, it is useful to give it in cases where the only symptoms are discomfort from the presence of the tumour or neuralgic pain. Should the tumour be increasing in size, or should there be much hemorrhage, we must have recourse to ergot.

When the patient can afford it, benefit is undoubtedly derived from a course of treatment of *mineral waters* (such as those of Kreuznach) as recommended for chronic metritis.

The symptoms due to the weight of the tumour may be relieved by *artificial support*. Thus patients with a small fibroid often derive great benefit from wearing a Hodge pessary; the discomfort of a large abdominal tumour is materially lessened by wearing a broad flannel bandage.

When the tumour nearly fills the pelvis and is beginning to press injuriously upon the bladder and rectum, we should, when possible, *push it up out of the pelvis* into the abdomen; this is done before the occurrence of pelvic peritonitis, which may hopelessly bind it within the pelvis. The most favourable case for this manipulation is a subserous fibroid with a distinct pedicle.

B. SURGICAL TREATMENT.

This consists in the removal of the whole tumour or portions of it through the vagina, or through the abdominal walls.

a. REMOVAL THROUGH THE VAGINA.

We have seen that this process takes place *spontaneously*, either by pedunculation and extrusion as a polypus or by enucleation. In *operating*, we simply favour these natural processes. The former will be described under "Treatment of Polypi" (see next chapter).

We favor enucleation of the tumour (1) by dilating or dividing the cervix uteri; (2) by incision of the mucous membrane covering the surface of the fibroid; (3) by stimulating the uterus to contract and expel it spontaneously from its bed, or by laying hold of and forcibly detaching it. These might be considered either as different consecutive operations, or as successive steps in the same operation.[1]

[1] Mathews Duncan: Edin. Med. Jour., Feb., 1867.

The *dilatation of the cervix* is effected by sponge tents or a bilateral incision with the scissors; incision with the thermo-cautery, as practised by Thomas, reduces the risk of hemorrhage and septic infection. Sometimes this is all that is required. After the division of the cervix, the hemorrhage (which is usually the indication of the operation) ceases; if the tumour is in the process of expulsion, this takes place more readily through the dilated cervix. Even diminution of the size has been observed after the operation, though there is no explanation of how this occurs.

Should this operation be insufficient, we proceed next to *incision of the mucous membrane covering the tumour*. The purpose is twofold. (1.) It checks hemorrhage. We have referred to the existence of venous sinuses in the capsule of the tumour, from which profuse hemorrhage sometimes occurs (*v.* Fig. 246); when these are cut through, they retract and are closed by thrombi. After this operation the hemorrhages are, for a long period at least, checked. (2.) It favours spontaneous enucleation of the tumour, which comes to protrude through the incised mucous membrane.

The mucous membrane is incised either with the bistoury or with the thermo-cautery as follows. Carry a probe-pointed bistoury, which has the lower half of the blade sheathed, into the uterus through the previously dilated cervix; make one or more incisions, about an inch long and from a quarter to half an inch deep, upon the surface of the tumour. The great danger of the operation is the introduction of septic matter; to diminish this risk, Greenhalgh employs the actual cautery with an olive-shaped bulb to incise the mucous membrane and at the same time to destroy the heart of the tumour; he also uses it to burn away, from time to time, portions of the tumour as they protrude through the capsule.

It is evident that the cautery can be used only when we have an interstitial fibroid which has forced itself into one lip of the cervix and projects markedly into the roof of the vagina (*v.* Fig. 244); or when a submucous fibroid has dilated the os sufficiently to become accessible to the cautery. The cautery, of which the Paquelin is the most convenient form, reduces the dangers of hemorrhage and septic infection to a minimum.

The separation of the tumour should be left to the natural efforts, and may extend over a period of months; during this time, to promote uterine contractions, the patient is kept fully under the influence of ergot. Greenhalgh remarks that "spontaneous expulsive efforts shortly followed the use of the cautery."

Should sloughing of the tumour occur during the process of natural enucleation, we interfere to remove the tumour rapidly. Even although there is no sloughing it is sometimes necessary to shell the tumour out of its bed.

Fig. 249.
A. R. Simpson's nail curette (1⅗) (A. R. Simpson).

The detachment of the tumour from its capsule may be effected by A. R. Simpson's nail curette (Fig. 249). It is intended, as its name implies, as a substitute for the finger nail, which would be the best instrument were it only strong enough to scrape through the tissues.

Fig. 250.
Thomas's spoon-saw (Thomas).

Thomas has devised a similar instrument which has the form of an elongated spoon with a serrated edge (Fig. 250); it is worked with a pendulum-like movement of the hand. The advantages claimed for it are that it limits hemorrhage, and, from its concave form, "hugs the tumour" so as not to cut deeply into the uterine wall. Before operating, he meas-

Fig. 251.
Side-view (to show curve) and face-view (to show cutting edge) of Marion Sims enucleator (Marion Sims).

ures with a whalebone probe the extent of attachment of the tumour to the wall of the uterus. He has "operated more than twenty times with this spoon-saw, and its efficiency becomes more and more apparent with increasing experience."

Marion Sims employs the enucleator represented at Fig. 251, and operates as follows. The tumour is drawn down to the os uteri; the capsule is incised with scissors, and detached as far as possible with the fingers; the enucleator is passed in between the tumour and its capsule, and worked round the former so as to free it on all sides; a tumour-hook is now hooked deeply into its substance, with which it is dragged down while the enucleator is used to sever any remaining connections; when necessary, the os is incised to allow it to pass.

When the tumour has been so far enucleated, spontaneously or by the artificial means described, the extraction of it is often difficult on account of its size. When it projects into the vagina, we lay hold of it with large volsella (Fig. 252) and make traction while the hand is passed up to the base of the tumour to sever any connection between it and its bed. The fundus uteri is at the same time pressed down and steadied by an assistant. In the case of large tumours, midwifery forceps are used for extraction. To allow a tumour of large size to be extracted, it may be necessary to divide it with scissors or the ecraseur and remove it in portions; we may even require to incise the perineum, if the vaginal orifice be small.

Thus with regard to *enucleation* and removal per vaginam, it is evident that, from the risks of the operation, we should interfere only when the severity of the symptoms justifies a dangerous operation or when nature is unable to complete the process of expulsion. The circumstances most favourable for removal by this means are when the tu-

Fig. 252.

Sir James Simpson's volsella for seizure of intra-uterine fibroids—two-thirds size. The blades are separable, and lock like a pair of midwifery forceps; after being locked, the blades are fixed with a screw-pin which serves as a joint (A. R. Simpson).

mour is small and loosely connected with the uterus, or when it has been already "born" into the lax and roomy vagina of a multipara.

b. REMOVAL THROUGH THE ABDOMINAL WALLS BY LAPAROTOMY.

This operation is of recent date, and medical opinion with regard to it is in the same state as it was in regard to ovariotomy twenty years ago. Although operators have had the experience of ovariotomy to fall back upon, the mortality is as yet 50 per cent. On the other hand we must remember that, as fibroid tumours do not endanger life in the same way that ovarian tumours do, the operation for their removal, being apparently associated with so much more danger, is only had recourse to in extreme, that is, in unfavourable cases. Whether the removal of fibroid tumours by laparotomy will in the future take the place that ovariotomy has at last gained for itself, we are not in a position to say. The fact that these tumours threaten the life of the patient only in exceptional cases makes this improbable. In reporting some cases of successful operation to the London Obstetrical Society in April, 1880, Knowsley Thornton says that he believes "that the removal of uterine fibroids by laparotomy is not only justifiable, but is an operation with a position in the immediate future in no way second to that now held by ovariotomy."

The merits of the operation cannot be judged from statistics, because each operator has tried a different method. Statistics enable us rather to compare the success of different methods of operating than to decide on the merits of the operation itself.

The following table gives the results of the leading operators.

Pean,[1]	up to Nov., 1879,	had operated	46	times with	30	recoveries.
Spencer Wells,[2]	" Dec., 1878,	"	25	"	10	"
Billroth,[3]	" Mar., 1880,	"	25	"	10	"
Koeberlé,[4]	" Dec., 1877,	"	19	"	9	"
Schroeder,[5]	" Dec., 1879,	"	18	"	11	"
Hegar and Kaltenbach,[6]	(new method), up to Sep., 1881,	"	12	"	11	"
Thornton,[7]	" April, 1880,	"	10	"	6	"
Thomas,[8]	" Sep., 1880,	"	7	"	4	"

[1] Académie de Méd.—Séance, 18 Nov., 1879.
[2] Brit. Med. Journ., May and Dec., 1878.
[3] Cited by Hegar and Kaltenbach: Operative Gynäkologie, S. 419.
[4] Gusserow: Neubildungen, etc., S. 90.
[5] Krankheiten der weiblichen Geschlectsorgane, S. 244.
[6] Die operative Gynäkologie, S. 420.
[7] London Obs. Trans., April, 1880. [8] Diseases of Women, 1880. p. 551.

From the preceding table two things are evident: (1) the mortality from the methods taken together has been great (45 per cent.); (2) the results from Hegar's method, to be presently described, are remarkably successful (mortality 8.3 per cent.). The number of cases (twelve) is not great; it remains to be seen whether this method will be equally successful in other hands.

Under laparotomy we include (1) the removal of pediculated subserous fibroids in which the uterus is left untouched, and (2) the amputation of a portion of the uterus along with the tumours. The ovaries may or may not be removed at the same time. When a portion of the uterus is cut away, it is necessary, should the operation be during the period of sexual activity, to remove the ovaries; fatal hemorrhage has occurred when they were left, and even abdominal conception and pregnancy.

The operation may be divided into three stages: (1) the opening into the abdominal cavity, (2) the diminution of the size of the tumour and its extraction, (3) the treatment of the stump.

1. The opening into the abdominal cavity is made just as in ovariotomy (*v.* Chap. XXII., Vol. I.).

2. The diminution of the size of the tumour is necessary when it is so large that it cannot be projected through the abdominal incision.

When the tumour is cystic, it is diminished by puncturing the cysts before extraction. Large solid tumours are diminished by gouging out portions, which is often accompanied with considerable hemorrhage. Pean diminishes the size of such tumours by "morcellement;" the tumour is transfixed with a double thread which carries in the wires of two of Cintrat's serre-nœuds (Fig. 257); by means of these, two portions are removed with little loss of blood; this process is repeated until the tumour is sufficiently reduced in size to be drawn through the abdominal wound.

3. The treatment of the stump is either by the *intra-peritoneal* or *extra-peritoneal* method.

When it is small and consists only of the pedicle of the tumour, it can be ligatured and *dropped* into the peritoneal cavity as in ovariotomy; when it is large and especially when (from the removal of a portion of the uterus) it consists of a uterine stump, the dangers of hemorrhage and peritonitis have led most operators to adopt the *extra-peritoneal* method. When a portion of the uterus is cut away along with the tumour, there is not only a greater risk of hemorrhage from the larger pedicle but there is

a track opened for septic infection, as the uterine canal communicates through the vagina with the external air.

Schroeder, however, prefers the *intra-peritoneal* method, even when there is a uterine stump. We shall describe his method of amputation of the uterus at the level of the os internum, as we saw him do it in the case of a large submucous fibroid of the anterior wall which endangered the patient's life by hemorrhage. The abdominal incision was made in the ordinary way. Vascular adhesions passing from the tumour to the pouch of Douglas were ligatured at two points and divided between these. The ovarian arteries—the course of which is seen in Plate III., Vol. I.—were ligatured

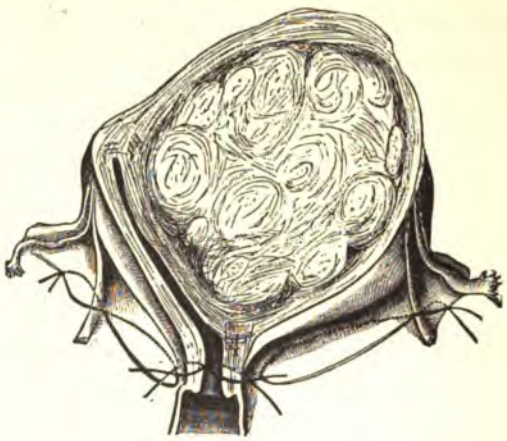

Fig. 253.

Position of ligatures in amputation of uterus at level of os internum. The cervix is ligatured in two portions, so that a ligature controls each uterine artery. Each broad ligament is ligatured in two portions which meet at the round ligament. The outer ligature controls the ovarian artery (Schroeder).

on each side. (These can be recognised by feeling their pulsation with the finger; or by holding the ligament against the light, when their course is easily seen.) A double silk ligature was carried on a needle from behind through the cervix so as to come out at the bottom of the vesico-uterine pouch in front; this was divided and the end of each half carried backwards through the broad ligament of its respective side, just external to the cervix, and knotted to its corresponding end; the cervix was thus tied in two portions, each uterine artery—the position of which is seen in Plate III., Vol. I.—being controlled by a ligature (Fig. 253). The tumour, with the body of the uterus and the ovaries, was cut away rapidly, with a large knife, above the ligatures. The uterine stump was cut

in a V shape ; and first the muscular walls were adapted with coarser, then the peritoneal covering with finer silk sutures (Fig. 254). The patient made a good recovery.

The *extra-peritoneal* method has been carried out by the following methods :

The ligature or clamp,
The clamp and cautery,
The serre-nœud,
The elastic ligature.

The extra-peritoneal method was, we believe, first attempted by Spencer Wells. Comparing the two methods, he says, " when it has been possible to secure the pedicle and fix it outside the wound in the abdominal wall, the result has been much more satisfactory." Of his 25 cases, setting

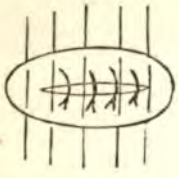

Fig. 254.

Ligaturing of the intra-peritoneal stump of the cervix. The deep ligatures which bring the muscular tissue together are represented as tied. The superficial ones bring only the peritoneal flaps together.

aside 3 of which the method is not specified, 13 were extra- and 9 intra-peritoneal. In 6 of the 13 cases, the pedicle was retained in the wound by means of *a clamp ;* in the rest by means of *the ligature,* aided in some cases by use of a pin.

The searing of the stump with the *actual cautery* without any ligatures, is the modification of the extra-peritoneal method adopted by Thomas. He uses the *clamp,* represented at Fig. 255, to arrest hemorrhage during the amputation of the uterus and while the pedicle is being seared. It is in two separate portions ; the one half is placed below the neck of the tumour or uterus, and the other then adapted to it and screwed down. To prevent retraction of the pedicle, it is before cauterisation transfixed above the clamp with long wire needles. After cauterisation the clamp is loosened, but left *in situ* for fourteen days so as to be screwed up should hemorrhage occur.

The extra-peritoneal method has met with great success in the hands of Péan, of Paris, who has the merit of having elaborated it as a distinct

method. He operates as follows. The tumour having, if necessary, been reduced by "morcellement," it is drawn out of the abdomen and held

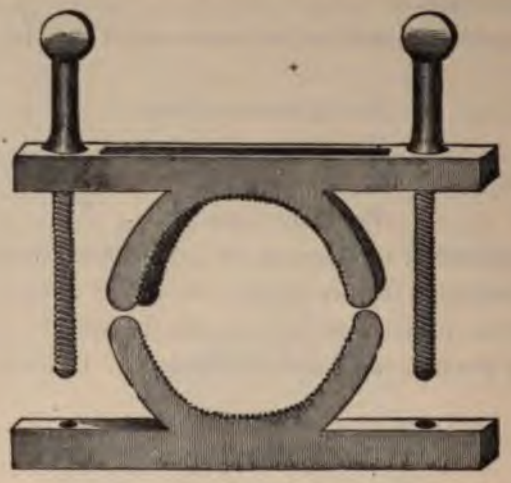

Fig. 255.

Thomas' clamp for securing the stump extra-peritoneally in the extirpation of fibroid tumours; the halves of the clamp are represented as lying apart (Thomas).

perpendicularly by an assistant. The operator, having ascertained with a sound the relations of the bladder (which only in rare cases requires to be dissected off), transfixes the cervix with two strong wires at right angles to each other. Below these wires, the curved needle represented at Fig. 256 is carried through the cervix and drags back a double wire.

Fig. 256.

Péan's curved needle for carrying the wires through the stump of the cervix (Leblond).

This wire is divided, and each half is fitted into a *serre-nœud* of Cintrat (Fig. 257), by means of which it is both tightened and twisted. The

tumour and uterus are amputated above the wires. The pedicle is placed in the abdominal wound, and is kept from retracting into the abdomen by means of the wires and the serre-nœuds ; these are left in position so that they may be tightened in case of hemorrhage.

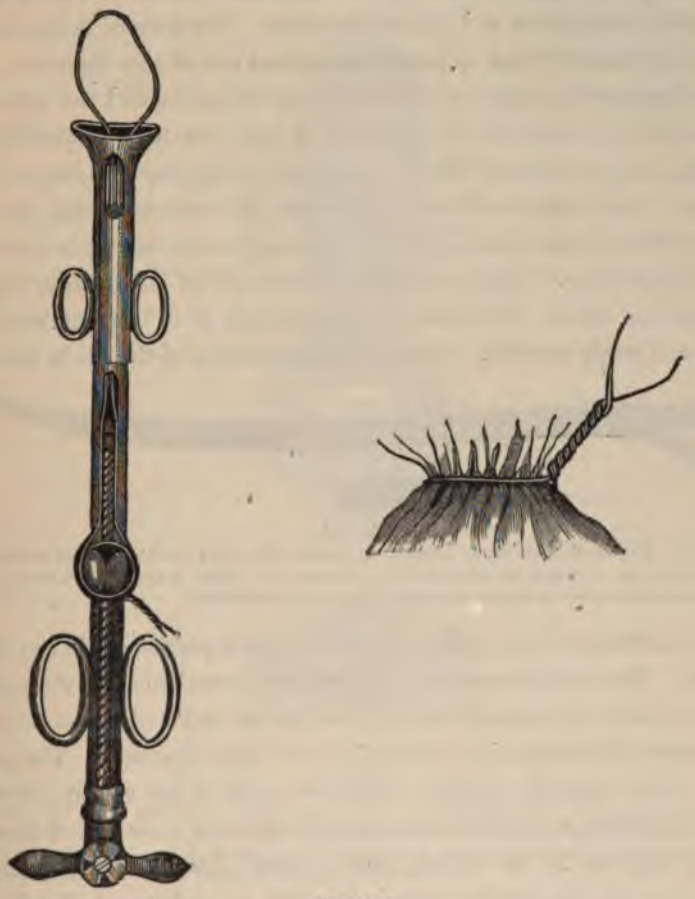

Fig. 257.

Cintrat's serre-nœud (Hegar). The wire after having been placed round the neck of the uterus or tumour is fixed on the two knobs which travel on the thread of the screw. On turning the handle when the middle piece is held firm at the larger loops, we tighten the noose; when the head-piece is held at the smaller loops, we twist the wire. The result is seen to the right hand side (Leblond).

The elastic ligature was introduced by Kleeberg. Its method of employment has been devised and carried out by Hegar, of Freiburg, in whose hands (as already said) it has produced the most brilliant results. Hegar's method consists in "constriction of the uterine stump with elastic ligatures, exact closure of the abdominal cavity by stitching the perito-

neum round the stump, and antiseptic treatment of the latter with the cautery and chloride of zinc." The abdominal incision is always made long enough to allow the tumour to be projected through it without artificial diminution. Temporary sutures are placed along its margins to keep the peritoneum in relation to the skin. Vascular adhesions are ligatured in two places and divided between. The tumour is laid hold of with a dry towel by one assistant and raised out of the abdomen, while another presses the edges of the abdominal wound behind the advancing tumour; the greatest care is required to hold the tumour steadily and vertically, as the stretched broad ligaments readily tear—leading to hemorrhage. The relations of the bladder and the ovaries having been exactly ascertained, the elastic ligature is placed round the cervix below the seat of amputation. This consists of a double ply of india-rubber ligature 5 millimetres thick. While kept at full stretch it is brought round the uterus and firmly knotted. Should this constriction of the whole stump be

Fig. 258.

Needle for carrying through elastic ligature. It consists of a sharp curved point, and a cannla split halfway up the side. A loop of the elastic ligature, stretched till it is thin, is drawn with a thread into the cannla, which is then screwed into the steel point (Hegar and Kaltenbach).

judged insufficient, it is further ligatured in two portions with the elastic ligature. The needle represented at Fig. 258 is used to carry through the stump a double ligature, which is then divided and tied round each half. The tumour and uterus are amputated above these ligatures. The peritoneum is now carefully adapted round the neck of the stump below the elastic ligatures; the silk suture, which brings only the edges of the peritoneum together in the bottom of the wound just below the pedicle, is looped into the side of the latter (Fig. 259, *a*) underneath the ligature (Fig. 259, *b*): the margins of the peritoneum above the pedicle are united in a similar way; the next two sutures of the wound bring together only the peritoneum, while those further up bring together all the coats of the abdominal wall. Thus there is produced a space which surrounds the pedicle and is floored by peritoneum; to keep this space thoroughly dry and aseptic, is the aim of the after-treatment. The projecting end of the stump is thoroughly cauterised; the raw surfaces round it are painted with solution (3–10 per cent.) of chloride of zinc, and cotton wadding,

which has been soaked in a 2 per cent. solution of the chloride and then thoroughly dried, is packed round the stump. Finally, the end of the stump alone is touched with 100 per cent. solution. The whole is covered with protective silk and carbolised wool, and the antiseptic dressing laid on so that it can be easily lifted.

Fig. 259.

Treatment of fibroid tumours by elastic ligature (Hegar and Kaltenbach). *a*, Abdominal incision with the stump in its lower angle; only the peritoneum is brought together with the lower sutures, while the upper sutures take in the whole abdominal wall. *b*, Same in section, to show the trough floored by the peritoneum round the stump and the position of the elastic ligatures.

The space round the stump is kept thoroughly dry by repeated dressing (three or four times daily, according to amount of discharge) with the chloride of zinc wool; the pedicle is pared away gradually with scissors to diminish its size, to allow the chloride to act more thoroughly, and to prevent pus from burrowing. The elastic ligature is clipped away about the tenth day.

Battey's operation has been frequently performed to check the menorrhagia associated with fibroid tumours and with good result (*v.* Vol. I., p. 201).

CHAPTER XXXVI.

FIBROCYSTIC TUMOUR OF THE UTERUS.

LITERATURE.

Atlee—Ovarian Tumours: Philadelphia, 1873. *De Sinéty*—Op. cit., p. 413. *Gusserow*—Neubildungen, etc., S. 102. *Heer*—Ueber Fibrocysten des Uterus: Zurich, 1874. *Leopold and Fehling*—Archiv. für Gyn., Bd. VII., S. 531. *Peaslee*—Ovarian Tumours: London, 1873. *Rein*—Archiv. f. Gyn., IX., S. 414. *Schroeder*—Op. cit., S. 213. *Spencer Wells*—Diseases of the Ovaries: London, 1872. *Spiegelberg*—Archiv. f. Gyn., VI., S. 348. *Thomas*—Op. cit., p. 551.

SYNONYM.—Cysto-fibroma.

ATTENTION has been directed only of recent years to this, the rarest form of uterine tumour. Its pathology is now being worked out, and at present we group under this head tumours which may afterwards be shown to be anatomically separable. Since ovariotomy has come to be extensively practised, they have derived their clinical importance from a close resemblance to ovarian tumours.

PATHOLOGY.

The majority of fibrocystic tumours are simply fibroid tumours which have become softened. The spaces between the bundles of fibrous tissue open out and contain serum; the trabeculæ between adjoining spaces give way, which allows these to run together to form larger cavities. Fig. 260 shows this in a *subserous fibroid*, which form most frequently undergoes this change.

The term "cystic" is, it is evident, misleading as applied to this form of tumour. The cavities are not "cysts," that is, they do not possess a special wall.

Koeberlé was the first to suggest that some forms of fibrocystic tumour might be due to *dilated lymphatics*. Leopold and Fehling have carefully described a case in which the cavities were lined with endothelium. The fluid from these cavities was of a clear yellow colour, *and coagulated* as

soon as it was exposed to the air; fibrin was present in it. To this form the name of *Fibromyoma lymphangiektodes* has been given. Atlee says that this coagulation of the fluid—formation of colourless blood-clot—is diagnostic of the fluid from *all* fibrocystic tumours, and may be relied on

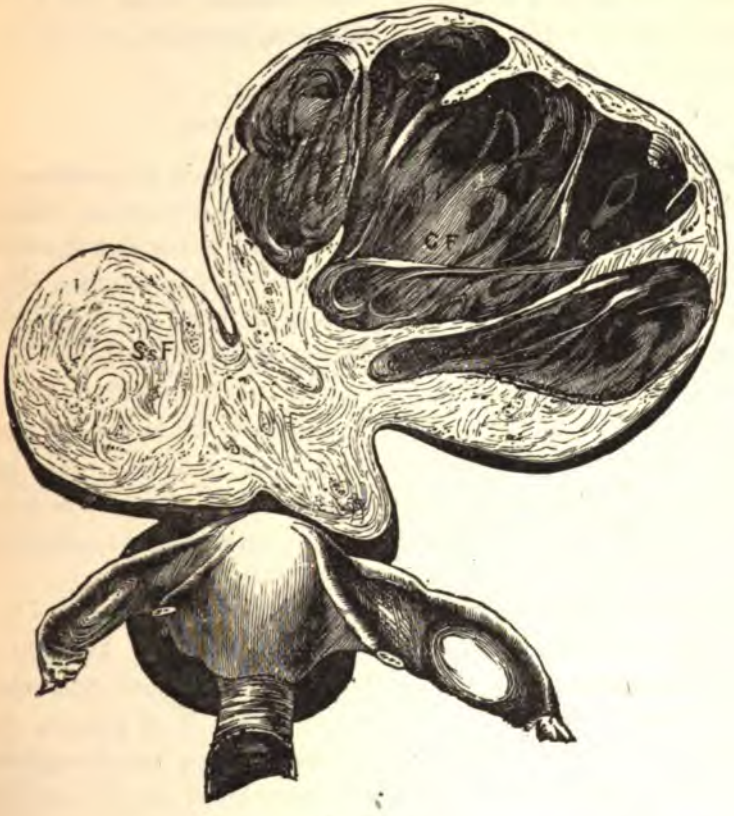

Fig. 260.

Large three-lobed fibroid springing from the fundus by a somewhat thin pedicle, of which C F is cystic, while S s F and the dark-shaded mass behind the uterus are subserous. This, along with two smaller fibroids growing from the posterior surface of the uterus, was removed by laparotomy (Schroeder).

to distinguish them from ovarian. Spiegelberg records a case in which this spontaneous coagulation of the fluid was observed, but the most careful microscopic examinations could detect no epithelial lining of the cavities. A transition case has been described by Rein, in which the cavities were not themselves lined with endothelium but *communicated* directly with the lymphatic spaces.

Mucoid degeneration of a fibroid tumour has been described by Vir-

chow as Myxomyoma. In this case the interstitial tissue contained fluid rich in mucin and with numerous nucleated round cells.

SYMPTOMS.

These are the same as those of fibroid tumours, except that their increase in size is rapid. As they are usually subserous, menorrhagia is not often present.

DIAGNOSIS; DIFFERENTIAL DIAGNOSIS.

Their diagnosis is often difficult, as the difference in consistence between the more solid and the fluid parts may escape detection. The most important point to make out is *the relation to the uterus*, and the *displacement* of the latter which is produced. To ascertain its connection with the uterus, we make the examination per rectum: to do this thoroughly, it may be necessary to anæsthetise the patient and to introduce two fingers; the uterus is at the same time drawn down with the volsella. As to the displacement of the uterus, it is elevated towards the abdomen; with an ovarian tumour, it is depressed to the front or to the back. The sound is now passed; if the uterine cavity is increased in size, and more especially if the movement of the tumour by an assistant is immediately communicated to the sound, the tumour is probably uterine.

Differential Diagnosis.—Their diagnosis *from ovarian tumours* is the most important and, at the same time, the most difficult. As in the majority of cases they are merely altered fibroid tumours, their differentiation *from a simple fibroid* is merely a matter of degree of softness. Their diagnosis from ovarian tumours is of importance as regards ovariotomy, though with greater experience in the extirpation of fibroids and a lower mortality, this may come to be of less importance.

TREATMENT.

The treatment consists in removal through the abdominal walls, according to the method described for fibroid tumours (v. p. 401).

CHAPTER XXXVII.

POLYPI OF THE UTERUS.

LITERATURE.

Barnes—Op. cit., p. 195. *De Sinéty*—Op. cit., p. 419. *Gusserow*—Op. cit., S. 130. *Hegar und Kaltenbach*—Die operative Gynäkologie: Stuttgart, 1881, S. 493. *Hicks, Braxton*—Three Cases of very large Polypi of the Uterus, etc.: Obstet. Journ. of Great Brit., Jan., 1879. *Mathews, Duncan*—Edin. Med. Journal, July, 1871; and Obstet. Journ., 1873, p. 497. *Simpson, Sir J. Y.*—Op. cit., p. 704. *Thomas*—Op. cit., p. 558. *Underhill*—On the Structure of Three Cervical Polypi, and The Structure of a True Mucous Polypus of the Cervix: Edin. Obst. Soc. Trans., vol. iv., pp. 231 and 241.

By the term "Polypus" is understood a pediculated tumour attached to the mucous membrane of the uterus. It includes the following tumours, which are anatomically distinct:

(1.) Submucous fibroids, which have become pediculated and are in process of extrusion;

(2.) Mucous polypi;

(3.) Pediculated cystic follicles;

(4.) Placental polypi.

For clinical reasons, it is convenient to use the term polypus in its general sense as implying an external form alone; the symptoms produced by these tumours resemble one another, and their exact nature is sometimes not made out till they are removed. Pathologically, the term should be limited to mucous polypi. It is confusing to speak of a fibroid tumour which has a broad base of attachment as a submucous fibroid, and of one which has a pedicle as a fibrous polypus. The polypoidal projections formed by pediculated ovula Nabothii are only pediculated retention-cysts. Placental polypi are not true new-formations.

1. *Pediculated submucous fibroid tumours* form the so-called "fibrous polypi." They spring from the *muscular* wall of the uterus, usually from the *body*, which, as we have seen, is more commonly the seat of fibroid tu-

mours than the cervix. They are of *firm* consistence, of a size varying from a goose's egg and upwards, and are of a rounded or pyriform shape (Fig. 261), sometimes elongated and constricted through the pressure of the uterine walls (Fig. 243); the surface is smooth or marked with furrows corresponding to the fasciculi of fibrous tissue.

Sometimes they are of such a size that, although lying in the vagina, they fill the pelvis and press on the bladder and rectum; the uterus is then raised above the pelvic brim (just as it is elevated when the vagina is

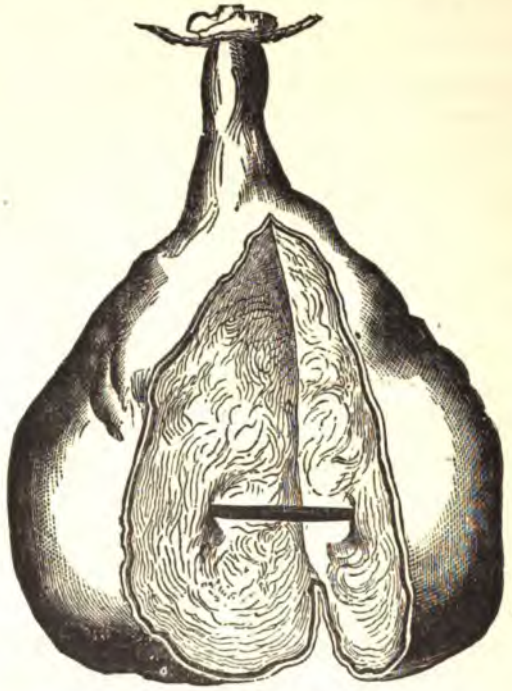

Fig. 261.

Fibrous polypus laid open to show its identity in structure with a fibroid tumour (Sir J. Y. Simpson).

distended with fluid), and is felt as a smaller body riding on the top of the tumour. Adhesions may form between the surface of the fibroid and the vagina, producing the impression that the tumour springs from the vaginal mucous membrane.[1]

The pedicle consists of a narrowing of the calibre of the tumour towards its base of attachment, or of a distinct stalk, which may be long enough to allow the fibroid to lie at the vulva. As fibroid tumours are

[1] Braxton Hicks: Loc. cit.

sparingly vascular, the pedicle does not as a rule contain large vessels. When a pediculated submucous fibroid lies in the cavity of the uterus, it sets up uterine contractions which lead to its expulsion ; there is a stage at which it lies partly within the uterus (Fig. 262), partly in the vagina (the portion constricted by the cervix has been mistaken for a pedicle, and only the lower lobe of the hour-glass tumour removed) ; finally, the

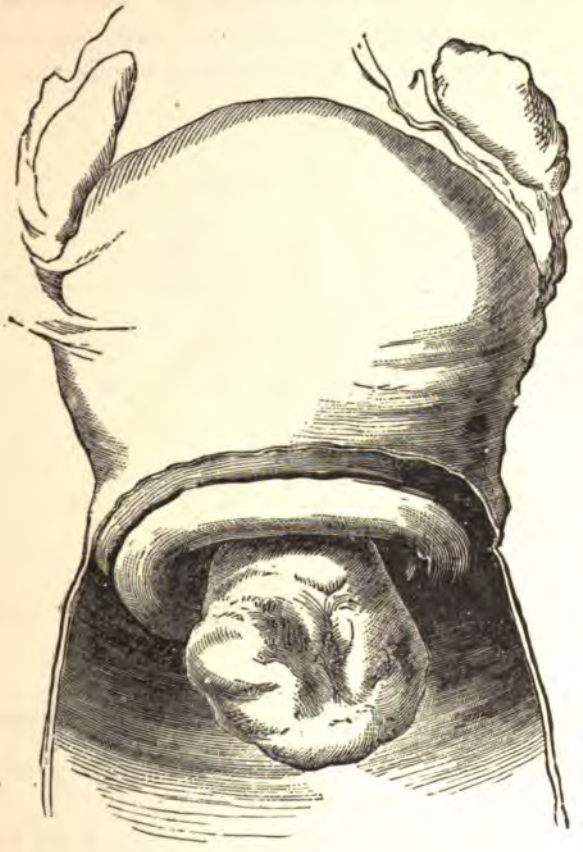

Fig. 262.

Intra-uterine submucous fibroid which is becoming vaginal (Sir J. Y. Simpson).

whole tumour lies in the vagina but still maintains its connection with the uterus through its pedicle (Fig. 263). The congestion of the fibroid excites uterine contractions specially at the menstrual period, and thus favours its expulsion. At those times only, we may have the cervical canal temporarily dilated and the polypus projecting through it ; after the period, the contractions pass off and the polypus is retracted into the uter-

ine cavity. This condition is fully described by French writers under the name of "polypes à apparitions intermittentes." Its practical importance is that we should examine sometimes at the menstrual period, when a polypus (not recognisable at other times) may be felt through a dilated cervix. They have the microscopic structure described at p. 82 (*v.* Fig. 261).

2. *Mucous polypi* are developed from the *mucous membrane* of the uterus, most frequently from that of *the cervix*. They are of *soft* pulpy consistence, of about the size of an almond—rarely larger—and have a flattened form; usually, there are more than one present (Fig. 264).

Fig. 263.

Submucous fibroid which has come to lie wholly in the vagina (Sir J. Y. Simpson).

They are extremely vascular and have the microscopic structure of the mucous membrane from which they are developed.

The typical cervical polypus has the structure seen at Fig. 265; the student should compare this with the section of the normal mucous membrane given in Vol. I., p. 19. From the fact that the gland ducts appear as channels on the surface, it was described by Oldham as the "channelled polypus." Sometimes the polypus shows also the stratified epithelium of the vaginal aspect of the cervix, as in a specimen described by Underhill; he supposes that in this case it sprang from the margin of the os externum; he describes also a polypus which sprang from the *vaginal aspect* and showed only the stratified epithelium. These polypi sometimes form the

starting-point of malignant disease; Underhill traced the commencement of sarcomatous formation in one case.

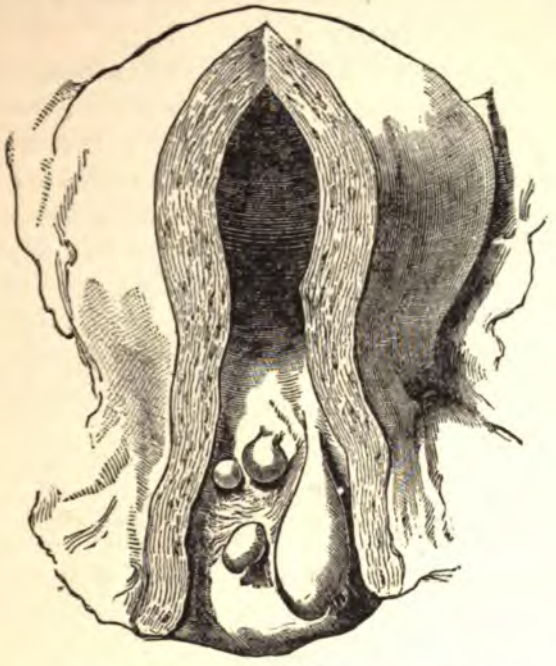

Fig. 264.

Group of mucous polypi growing in the cervix uteri (Sir J. Y. Simpson).

De Sinéty divides them into two groups according as they spring (1)

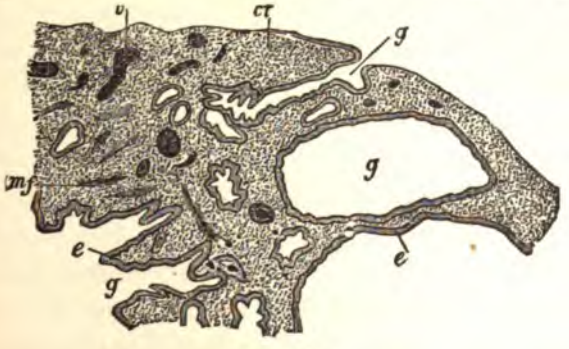

Fig. 265.

Section of a mucous polypus of the cervix ($^{40}/_{1}$). *g*, dilated glands; *e*, epithelium; *mf*, muscular fibre; *v*, blood-vessel; *cf*, connective tissue (de Sinéty).

from the cervix, (2) from the body of the uterus. Each has the characteristic epithelium (see Vol. I., p. 18) lining the ducts and cysts; the former

have the columnar non-ciliated epithelium of the cervix, the latter the ciliated cylindrical epithelium of the body.

3. *Pediculated Nabothian follicles* have been already described under Cervical Catarrh (Vol. I., p. 291).

In old people we often find the whole mucous membrane of the uterus covered with small polypoidal cysts. We have already referred to this condition as a final stage of chronic endometritis (Vol. I., p. 303).

4. *Placental or Fibrinous Polypi.*—These are produced as the result of incomplete detachment of the placenta; in some cases we can trace placental villi in their structure. On the surface of this irregularity of the mucous membrane, blood coagulates; and thus the fragment of placenta grows larger through being coated with fibrin. This increase in size may go on until the polypus is the size of an egg. This form of polypus is not a new formation and only finds a place here on account of its polypoidal form.

SYMPTOMS.

These are Hemorrhage,
Leucorrhœa,
Dysmenorrhœal pains,
Sterility,
Irritation and discomfort.

The *hemorrhage* shows itself first as an increase of the ordinary menstrual flow; afterwards, it comes at irregular intervals. In the case of a submucous fibroid, it comes from the uterine mucous membrane, which is hypertrophied. In the mucous polypus, it comes from the tumour itself, which is vascular and bleeds easily; when the polypus protrudes through the cervix, there may be hemorrhage whenever the patient strains or after coitus. It is important to remember that a small polypus has produced a fatal hemorrhage[1] (v. the preparation represented at Fig. 101, Vol. I.). In other cases the drain of blood, though not directly fatal, may produce profound anæmia. The cachectic appearance of the patient, thus induced, may be such as to lead us to form a strong prepossession in favour of the existence of malignant disease before we proceed to physical examination.

Hence the importance of ascertaining and removing the cause of the hemorrhage.

[1] Barnes records the case of a woman of 26 years of age in which a polypus the size of a walnut produced a fatal hemorrhage.

The *leucorrhœa* is due to the endometritis which is always present. The polypoidal retention-cysts are the result of a chronic catarrh of the cervix or uterus. It is disputed whether mucous polypi are the cause or the result of the inflammatory changes; de Sinéty inclines to the latter view. When the polypus comes to lie in the vagina, it produces an irritating vaginal leucorrhœa.

The *dysmenorrhœal pains* are due to the muscular efforts of the uterus to expel the polypus, and are most marked when the polypus has descended to the os internum or lies in the cervical canal.

In rare cases the presence of the foreign body in the uterus has produced the sympathetic phenomena of pregnancy—pigmentation of the breasts and abdomen, and morning sickness.

Sterility is occasioned by the mechanical obstruction of the polypus, either in the cervical canal or at the entrance to the Fallopian tubes. The obstruction in one case was not sufficient to prevent the spermatozoa from passing upwards, but hindered the entrance of the fertilised ovum into the uterine cavity and thus produced Fallopian tube gestation.

A pediculated fibroid may form a serious complication to labour, in preventing the progress of the child's head; such a polypus has been laid hold of with the forceps under the impression that it was the presenting head.

DIAGNOSIS.

1. *When the polypus has dilated the os externum*, it will be recognised by the finger per vaginam. If it be larger than a walnut and of firm consistence, and if the uterine cavity be increased in length, it is a pediculated fibroid tumour. If it be small and of a pulpy consistence, it is a true mucous polypus; mucous polypi do not, as a rule, produce hypertrophy of the uterus.

Having learned that there is a pediculated body in the vagina or cervical canal, carry the finger upwards to ascertain its point of attachment; if this be high up in the uterine cavity the tumour is a pediculated fibroid; if it springs from the cervical mucous membrane, it is probably a mucous polypus.

On bimanual examination, the uterus is found to be enlarged in the case of pediculated fibroids; it is not enlarged with mucous polypi, unless from associated chronic metritis.

The speculum shows that the surface of the true mucous polypus has

a bright cherry-red colour, which contrasts with the darker red of the cervical mucous membrane embracing it. The appearance of the fibroid tumour depends on the condition of the investing mucous membrane which is often ulcerated or sloughing. When the capsule has given way the fibrous substance of the tumour is seen to be of a paler colour.

2. *When the uterus is enlarged but the os externum not dilated,* the diagnosis is more difficult (Fig. 266). If the uterus be markedly enlarged

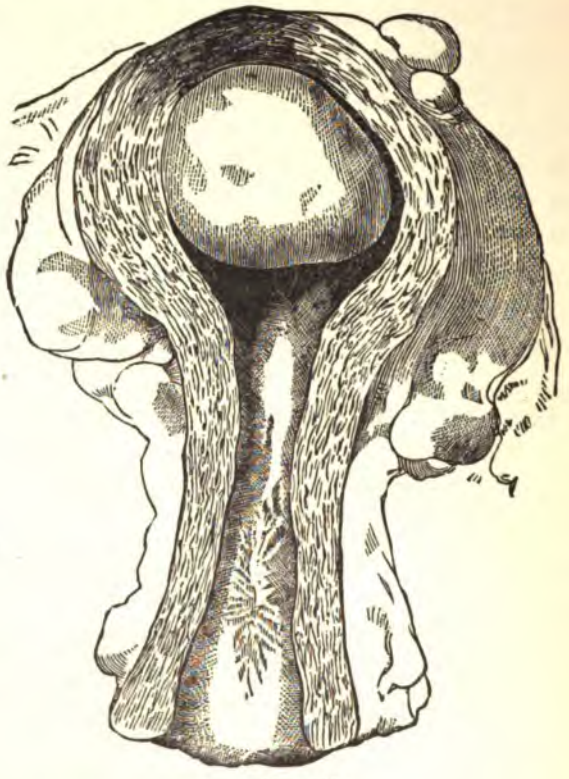

Fig. 266.

Pediculated submucous fibroid, springing from the fundus, which has not dilated the cervical canal (Sir J. Y. Simpson).

and of firm consistence and (the possibility of pregnancy being excluded) the sound pass for 4 or 5 inches, there is probably a submucous fibroid tumour. It is difficult to determine whether it is pediculated or not. We endeavour first to pass the sound round the tumour or upwards on different sides of it. Fig. 248 shows how the sound passes in a case of a pediculated tumour attached to the fundus. The sound must be used

with care, as its use is not unattended with risk; laceration of the mucous membrane, with the introduction of septic matter, has resulted from too free and repeated exploration in this way. Dilatation of the cervix and exploration with the finger are sometimes necessary to ascertain whether the fibroid be pediculated, and to what part of the uterus it is attached.

3. *When the uterus is not much enlarged,* the diagnosis is very difficult. The possibility of a fibroid tumour is not excluded. A small mucous polypus, however, may exist in the uterine cavity and escape detection with the sound. In such a case, it is only recognised on dilating the cervix and exploring the uterine cavity with the finger.

The *curette* is a valuable aid to diagnosis when the actual exploration of the uterine cavity with the finger is not desirable. By its use we diagnose and treat the case at the same time. Thus irregularity of the uterine surface (which is easily detected by the curette) and the character of the scrapings removed, may show that we have to do with pediculated retention-cysts or placenta polypi.

DIFFERENTIAL DIAGNOSIS.

The characters which distinguish a pediculated fibroid from a mucous polypus are its larger size, firmer consistence, and its springing from the body of the uterus. The uterine cavity is increased in size. We find probably other fibroid tumours interstitial or subserous.

A pediculated fibroid hanging down into the vagina, may readily be mistaken for the inverted fundus uteri; this is most likely to happen when there is much hemorrhage from the former, and when concomitant pelvic inflammation makes examination difficult. A true diagnosis here is all-important, as removal of the fibroid may save the patient's life; while amputation of the uterus, under the supposition that it was a fibroid, might lead to disastrous consequences. The preparation shown at Fig. 267 is interesting in this connection. The case had been sent into hospital as one of inverted uterus. It is evident how the form of the tumour in the vagina and the fact that it bled freely, would in the absence of further examination lead to this mistake.

Given a tumour the size of a pear hanging down through the cervical canal into the vagina, we wish to make sure that it is not the inverted fundus. First, sweep the finger carefully round the neck and note whether the mucous membrane of the cervical canal is reflected on to the neck of

the tumour; sometimes inflammatory adhesions round the neck produce a condition simulating inversion. Now make the bimanual; if the body in the vagina be a fibroid, the uterus will be in its normal place. The abdomino-vaginal examination is often difficult on account of the body in the vagina; therefore pass the finger into the rectum, through the anterior wall of which we can distinctly feel whether the cervix has a truncated end above (inversion) or passes up into the body of the uterus (fibroid); the

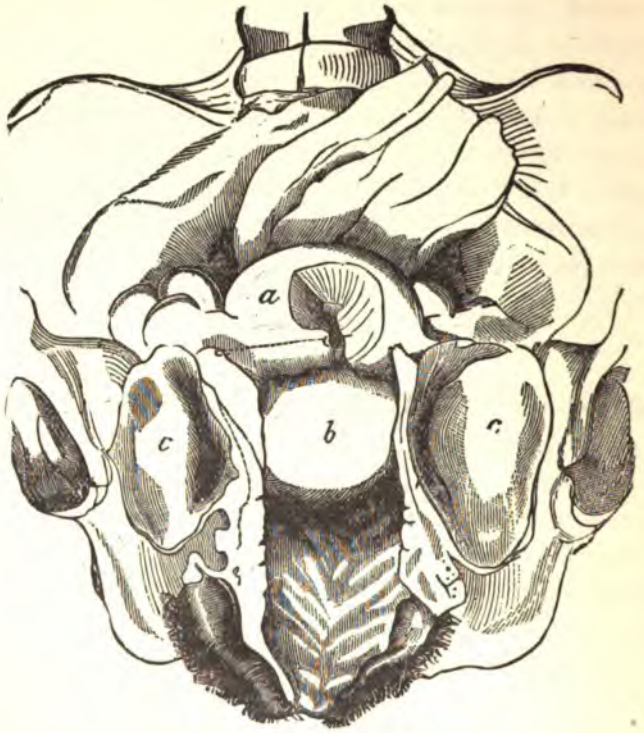

Fig. 267.

a, uterus with a portion of the anterior wall cut out; *b*, pediculated fibroid attached to back wall immediately above os internum. The front of the bony pelvis has been removed; *c c*, halves of divided bladder (A. R. Simpson).

abdomino-rectal makes this more evident. When examination is difficult and the diagnosis doubtful, we should not hesitate to give chloroform and make a thorough examination; it is well to be prepared to operate at the same time, if necessary.

Finally use the sound, which is the crucial test. Sweep the finger carefully round the neck of the tumour and feel for a depression corre-

sponding to the os, into which endeavour to introduce the sound. If it passes for two and a half inches or more and is then arrested, it is probably in the uterine cavity; make sure of this by pressure with the hand on the abdominal wall, or per rectum.

When the tumour in the vagina fills the pelvis or rides above the brim, so that the finger cannot reach the pedicle or feel whether the os is present, the diagnosis is very difficult. We rely on careful abdominal palpation to ascertain whether the uterus can be felt riding on the top of the tumour.

We must not forget that we may have both conditions present, *i.e.*, pediculated fibroid + a certain amount of inversion.

PROGNOSIS.

The prognosis as to *danger to life* will depend on the hemorrhage. Wherever a polypus is present, we should advise its removal.

As to *the operation*, the removal of mucous polypi and smaller fibroids is a safe and easy operation. The fear of hemorrhage from the pedicle of a fibroid tumour, which led to the treatment by ligature, has been found by experience to have been exaggerated. Where there is a rigid cervix to be dilated before we can remove the tumour, where the tumour is large so that it must be removed in portions, where there is a thick pedicle and consequently a larger raw surface, the operation will be a more serious one and the prognosis given more guardedly.

Should there be pregnancy, the polypus may be removed without interrupting its course. If it be of such a size as to interfere with labour, it should be removed as soon as discovered.

TREATMENT.

Whenever it is necessary to dilate the cervix for diagnosis, we should have instruments ready to remove the tumour at the same sitting. The dilatation is effected by laminaria tents, or by Tait's graduated dilators. A good method is to place a laminaria tent in the cervix to start the dilatation; after six or eight hours chloroform the patient, fix the cervix with volsella, and introduce the graduated dilators in succession till the cervical canal is wide enough to admit the index finger; remove the polypus by the means to be described; wash out the uterine cavity with 1 to 60 carbolic solution.

Small *polypoidal projections* are removed with the curette, as described under endometritis, followed by the application of carbolic acid.

Mucous polypi are twisted off with the forceps, shown at Fig. 268. It is advantageous to use forceps with a catch, as this keeps a steady hold of the tumour and leaves the operator's fingers free to twist the forceps round.

Fig. 268.
Forceps with catch, for removing mucous polypi.

In removing *fibroids*, we first ascertain the seat of insertion and size of the pedicle. When the tumour is small, we can learn this by the fingers; when so large that we cannot get the fingers past the tumour to the pedicle, we probe round its base with the sound, or laying hold of the tumour with forceps, endeavour to rotate it and thus test the thickness of the pedicle.

The pedicle will yield to torsion with the forceps. This is the simplest method and should always be tried in the first instance; the forceps shown at Fig. 252, or a pair of Nélaton's forceps (Fig. 135, Vol. I.), are most suitable. If this fail, divide the pedicle with curved scissors. Make traction with the forceps to render the pedicle tense; too forcible traction might produce inversion. Guarding the uterine wall with the fingers, carry in the curved scissors. In cutting, make the scissors hug the surface of the tumour and thus keep clear of the uterine wall. To divide the pedicle Sir James Simpson introduced the polyptome (Fig. 269). Strangulation by ligature, formerly widely practised, is now entirely abandoned; the sloughing stump was a fruitful source of septicæmia.

When the pedicle is of considerable thickness, it may be divided with the ecraseur or with the galvano-caustic wire. The wire ecraseur is preferable to the chain ecraseur, as it is more easily applied. For the nature and method of use of the ecraseur, the student is referred to treatment

of Carcinoma of the Cervix. The galvano-caustic wire has been used extensively by Byrne[1] of Brooklyn, whose paper on this subject should be consulted.

When the size of the tumour makes the pedicle inaccessible, it must be diminished. This is best effected by Hegar's method; traction is made on the tumour, which is at the same time incised in a spiral manner with scissors; the tumour is thus (as it were) unwound, till finally the pedicle is reached and divided.

Fig. 269.
Sir J. Y. Simpson's polyptome (Sir J. Y. Simpson).

Chloroform is not necessary for the removal of smaller polypi. The section of the pedicle is painless; if pain be present on tightening the ecraseur round the neck of a polypus, the operator should examine carefully again to make sure that the wire is not constricting the inverted fundus. Where the polypus is large and the operation tedious, it is better to have the patient anæsthetised, as the operator has then more freedom.

[1] Electro-cautery in Uterine Surgery. New York, 1873.

CHAPTER XXXVIII.

CARCINOMA UTERI (OF CERVIX); PATHOLOGY AND ETIOLOGY.

LITERATURE.

Barbour—Case of Carcinoma of the Female Pelvic Organs: Edin. Med. Jour., July, 1880. *Barnes*—Op. cit., p. 821. *Gusserow*—Die Neubildungen des Uterus: Stuttgart, 1878, S. 177; and Ueber Carcinoma Uteri, Volkmann's Samml. klin. Vor., N. 18. *Ruge and Veit*—Zur Pathologie der Vaginalportion, Erosion und beginnender Krebs: Stuttgart, 1878. *Schroeder*—Op. cit., S. 264. *Simpson, Sir J. Y.*—Op. cit., p. 140. *Tanner*—On Cancer of Female Sexual Organs: London, 1863. *Virchow*—Ueber Cancroide und Papillargeschwülste, 1850. The student will find the fullest references to literature in Gusserow and in Ruge.

By Carcinoma Uteri is usually understood Carcinoma of the Cervix, because in by far the larger proportion of the cases (98 per cent.) this is the seat of the disease. The rarer condition of Carcinoma of the Body will be described separately.

PATHOLOGY.

On no subject in pathology has more been written and a greater variety of opinion expressed than on carcinoma. We have endeavoured to arrange, in the table on the page following, the facts most important for the student to know.

CLASSIFICATION.

There are three varieties of carcinoma usually given in the English text-books. These are medullary (encephaloid) and scirrhous cancer, and epithelioma. Now the distinction between the first two is merely a question of degree; in the former the cellular element, in the latter the fibrous stroma is in excess. When we say that medullary cancer is frequent but scirrhous rare, we only mean that carcinoma runs a rapid course when it occurs in the uterus. The distinction between these two and epithelioma

Classification according to Clinical Features.	Forms.	Origin.	Position.	Progress.
Carcinoma progresses rapidly; produces metastasis; affects connective tissue rapidly.		from the cervical epithelium of constricted cervical glands (Klebs);	in substance of cervix.	produces thickening, then ulceration;
		from plugs of the deepest layers of squamous epithelium on the vaginal aspect of cervix (Waldeyer).		
		from connective tissue cells of cervix (Virchow).		
Epithelioma or Cancroid progresses slowly; does not produce metastasis; spreads by extension.	flat (flache cancroid)	from the cubical epithelium of cervical canal (Klebs);	superficial within cervical canal.	excavates cervix;
		from plugs of the deepest layers of squamous epithelium on vaginal aspect of cervix (Waldeyer).		
	papillary	from the deepest layers of squamous epithelium on vaginal aspect of cervix (Klebs and Waldeyer);	superficial, outside of cervix.	spreads downwards into vagina (cauliflower excrescence).
		from connective-tissue cells (Ruge and Veit).		

When ulceration and breaking down have been produced these forms are no longer distinguishable.

is more marked and is therefore given in the table, but it is very doubtful whether it rests on a pathological basis.

From the above it is evident that we are not yet in a position to make a scientific classification. The division according to clinical features into *true carcinoma* and *cancroid* (καρκίνος and εἶδος, *like cancer*) is convenient: it expresses nothing more than that in some cases progress is more rapid than in others; and that the disease in the one case produces metastatic deposits, in the other remains local.

ORIGIN.

As regards the origin, there are two distinct views. That the disease arises from *connective tissue cells alone*, is the view maintained by Virchow and his followers; while Thiersch and Waldeyer hold that in *all cases* it originates in *epithelial cells*. In the cervix, as possible sources, there are two varieties of epithelium; the squamous on the vaginal aspect, the

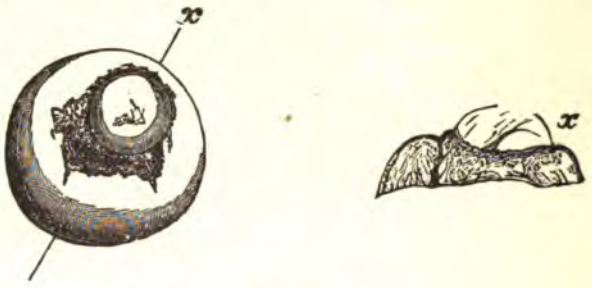

Fig. 270.
Carcinomatous nodule growing in one lip of the cervix and pushing the mucous membrane outwards. The figure to the right is a section of the cervix made through the line *x* (Schroeder).

cubical lining the canal. In the *flat* cancroid of the cervical canal, it arises from the cubical epithelium which lines the latter; in the papillary form it originates in the cells of the rete Malpighi on its outer aspect (Klebs). It will be seen that Waldeyer holds the view that, in all cases, it arises from the latter only.

The most recent investigations into the origin of carcinoma are by Ruge and Veit. According to them carcinoma arises, in the majority of cases, from a transformation of the connective-tissue cells; even the papillary form which produces the so-called cauliflower excrescence, although it apparently springs from the epithelium, is developed from the connective-tissue cells. The connective-tissue stroma becomes vascular and

almost like granulation tissue. The young cells, which are apparently produced from the connective-tissue corpuscles, take on an epithelial character. These observers never saw plugs of epithelium extending downwards into the connective tissue.

POSITION.

There are apparently three places in the cervix where carcinoma may develope. It may begin as hard *nodules in the substance of the cervix* underneath the mucous membrane; these increase in size, come to the surface of the mucous membrane (Fig. 270) and produce ulceration. More rarely does it commence in the *interior of the cervical canal* and spread along its mucous membrane so as to excavate the canal. In the

Fig. 271.

Microscopic section of a portion of the cervix uteri seen in Fig. 270. *e*, squamous epithelium in several layers; *c n*, carcinomatous nodule; between these is seen a portion of inflamed mucous membrane covered with a single layer of epithelium (Schroeder).

third place, it may appear *on the vaginal aspect of the cervix* as an irregular papillary tumour, which, extending downwards into the vagina, attains considerable size. It is then known as the cauliflower excrescence. Whether this form of carcinoma is the result of degeneration of simple papillary growths or is malignant from the commencement, it is impossible to say.

PROGRESS.

During the first stage we may distinguish the three forms, but after ulceration has occurred they pass into one another and are no longer distinguishable.

As regards the further progress, Schroeder distinguishes *three modes of the spreading* of the disease: first, upwards, into the body of the uterus; second, downwards, into the vagina; and, third, into the connective tissue of the pelvis. This last is the most important. It takes place either by a

Fig. 272.
Section of a flat cancroid (epithelioma) of the cervix. *e*, squamous epithelium; *c c*, carcinomatous cells; between these is seen some granulation tissue (Schroeder).

continuous infiltration of the adjacent connective tissue, or as a chain of nodules running in the direction of the utero-sacral ligaments; these nodules, probably, correspond to lymphatic glands.

EXTENSION TO NEIGHBOURING ORGANS.

In its further progress, the carcinomatous growth invades the surrounding organs. Pushing its way forwards in the cellular tissue between the *bladder* and the uterus, it involves the mucous membrane of the former; it first produces vesical catarrh, then sloughing of the walls, and finally vesico-vaginal fistula. The bladder is affected in a considerable proportion of cases; of 311 cases of carcinoma this occurred in 41 per cent., fistula resulting in 18 per cent. (Gusserow). From the position of the ureters, they are frequently involved. The carcinomatous growth may press upon the ureters near their point of entrance into the bladder, or it infiltrates their walls and the consequent thickening produces constriction at the part affected. Thus results dilatation of the ureter above, which produces hydronephrosis and finally atrophy of the kidney. The frequency of this condition will be apparent from the fact that Blau found it

present in 57 out of 93 post-mortem examinations. More rarely does the carcinomatous infiltration extend backwards into the *rectum* and

Fig. 273.

Carcinoma beginning in the cervix uteri, and ending in the production of recto-vesico-vaginal fistula (Farre).

produce recto-vaginal fistula; of 282 cases the rectum was affected in 18 per cent., fistula resulting in 8.5 per cent. (Gusserow). When both

Fig. 274.

Vertical mesial section of pelvis, from case of carcinoma uteri. *a*, perineum; *b*, symphysis pubis; *c*, rectum; *d*, body of uterus; *e*, small fibroid; *f*, urethro-vaginal septum; *g*, bladder. A small tube passes between bladder and excavated cervix through a fistula (Barbour).

bladder and rectum have been opened into, a common cloaca is produced as in Fig. 273.

Perforation into the *peritoneal cavity* is rare. The peritoneum is not simply pushed forward, but is taken up into the carcinomatous growth. As this process goes on, adhesions are constantly being formed between the walls of the peritoneum in front of the growth so that it does not project free into the cavity beyond. These adhesions further prevent the peritoneal cavity from being opened into when the carcinomatous mass breaks down.

The accompanying sections, made from post-mortem preparations, will serve to illustrate some of the points noted above.

Points to be noted in Fig. 274.

1. Seat of disease in the *cervix;*
2. Complete destruction of the cervix and lower segment of the uterus;

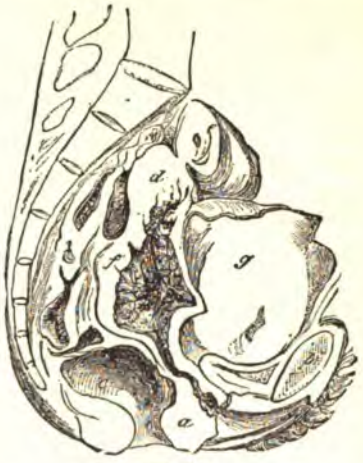

Fig. 275.

Vertical mesial section of pelvis, from case of carcinoma vaginæ et uteri. *f*, points to vagina eroded by disease; *e* is a malignant growth attached to uterus. Other letters as in Fig. 274 (Barbour).

3. Production of an irregular cavity through the extension of the disease in *three* directions through the cellular tissue—

(*a*) Behind the uterus,

(*b*) Between the uterus and the bladder,

(*c*) Between the vagina and the bladder.

4. The pouch of Douglas entirely obliterated and partially replaced by the carcinomatous excavation, the vesico-uterine pouch shortened by adhesions, perforation into the peritoneal cavity at one point;

5. Bladder small and contracted, carcinomatous fistula;

6. Rectum intact.

Points to be noted in Fig. 275.

1. Vagina (as well as cervix) affected, the nymphæ had a cartilaginous consistence, inguinal glands enlarged—although not shown in figure;

2. Extension of the disease along the mucous membrane of the uterus, excavating it though not destroying the walls to the same extent as in Fig. 274;

3. Partial obliteration of the pouch of Douglas;

4. Bladder dilated through pressure on the urethra, its walls apparently not involved;

5. Rectum intact.

ETIOLOGY.

The female sex is more liable to carcinoma than the male. According to Sir J. Y. Simpson's statistics, the proportion is as $2\frac{1}{2}$ to 1. These statistics are drawn from the annual reports of the Registrar-General for England during the years 1847–1861. During that time there were 87,348 fatal cases of carcinoma, of which 61,715 were among women and 25,633 among men. For the year 1860, the deaths from carcinoma among men were .97 per cent. of the total male mortality, among women were 2.2 per cent. The cause of this greater relative frequency is connected with the development of the sexual organs in the female. Up to puberty, the mortality (from carcinoma) of the sexes is the same; afterwards, the relative proportion of female to male deaths gradually rises till it attains its maximum about the age of 50, after which it falls away again (Fig. 276).

The diagram on page 140 is based on the statistics of 91,058 deaths in Great Britain. It brings out three facts: the total number of deaths in each sex increases with age to a certain point; the increase among women is relatively the greater; it reaches its maximum at an earlier age with the female sex.

The most frequent seat is in the uterus, where fully one-third of the total cases occur; the next in frequency is the mamma.

Although the immediate etiology of carcinoma is unknown, there are certain causes, general and local, which favour its development.

1. The *general predisposing causes* are the following:

Heredity;
Age;
Depreciation of the vital powers.

NUMBER OF CASES.

Out of 91,058 deaths from carcinoma—

751	males,	773	females	died	under 15 years.				
562	"	659	"	"	from 15 to 25 years.				
1,244	"	3,176	"	"	"	25	"	35	"
2,717	"	9,975	"	"	"	35	"	45	"
4,973	"	16,668	"	"	"	45	"	55	"
7,220	"	15,813	"	"	"	55	"	65	"
6,286	"	11,840	"	"	"	65	"	75	"
2,637	"	4,616	"	"	"	75	"	85	"
364	"	689	"	"	"	85	"	95	"
20	"	39	"	"	above 95 years.				

(Sir J. Y. Simpson.)

NUMBER OF DEATHS.

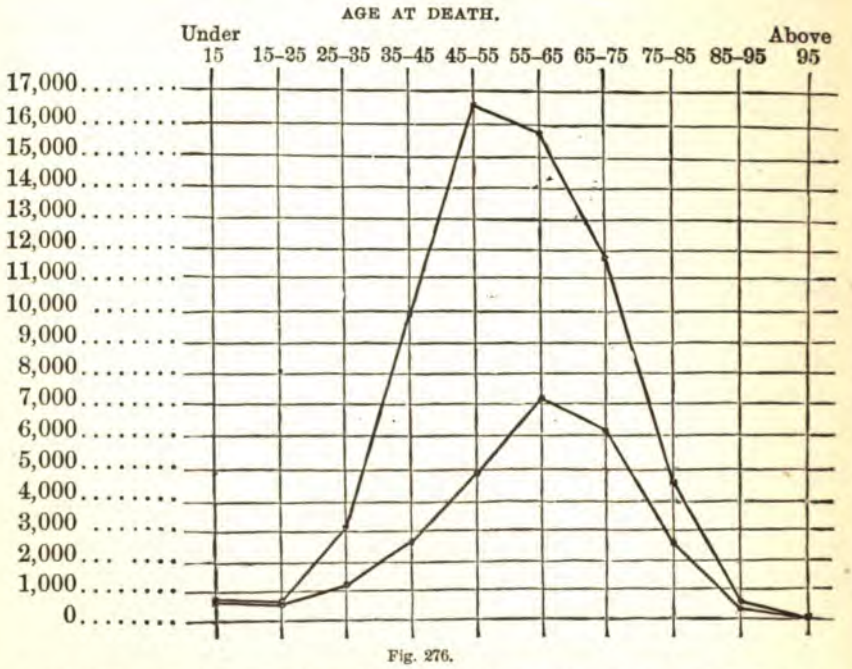

Fig. 276.

Table and diagram of comparative fatality of carcinoma in male and female, according to age. In the diagram, the *upper* line indicates mortality in female, the *lower* that in the male.

The influence of *race* is brought out in Chisholm's statistics, which show that carcinoma is more than twice as frequent among the white population as among the black. As regards *heredity in families*, much less stress is now laid upon this than formerly.

> According to Gusserow's statistics, in 1,028 cases heredity was only proven in 79, that is in about 7.6 per cent. Schroeder placing the statistics of Sibley and of Barker together shows that heredity has only been proven in 8.2 per cent; Picot places it at 13 per cent. These figures show that we cannot lay much stress on heredity as a predisposing cause. On the other hand we must remember that these statistics are drawn principally from hospital reports, from a class of people who know little about the former history of their families.

Age has undoubtedly a considerable influence upon the frequency of this disease. This is evident from the table given on page 142. Gusserow collected statistics of 2,270 cases reported by various authorities. The mortality per cent. for various ages is represented by the curve in the diagram on page 142. From the table it is evident that carcinoma does not occur before puberty. The proportion of cases below 20—2 in 2,270—is so small that it need not be taken into account. The first glance at the diagram would lead one to believe that the increasing frequency of the disease is due to the development of the functional activity of the sexual organs, but a more careful consideration shows that the increase continues and reaches its maximum after the latter has ceased. The explanation lies probably in the fact that the power of the tissues for resisting morbid development diminishes with age. This table should be compared with that for Fibroid Tumours on page 91.

Whatever tends to *depreciate the vital powers* favours the occurrence of this disease. We meet with it more frequently among the poorer classes, where there is insufficiency of food with privation and hardship. Schroeder contrasts, in this respect, the development of carcinoma with that of myoma. In his polyclinique among the poorer classes, the proportion of carcinoma to myoma was as 100 to 61; in his private practice among the wealthier, it was 100 to 332.

2. The *local predisposing causes* are the following:

Erosion of the cervix and protracted catarrh;

Repeated parturition.

The relation of *erosion and laceration of the cervix* to the development of carcinoma has been recently pointed out by Ruge and Veit and also by Breisky. We draw attention to this point specially, because the most important differential diagnosis is that between long-standing inflammation and commencing malignant disease. The possibility that the former may pass into the latter should always be kept in view.

Repeated parturition has an important influence. Carcinoma is much more frequent in multiparæ. Gusserow finds an average of 5.1 children to every case of carcinoma, which is a high average productivity. Whether this is due to the greater functional activity of the uterus or to the production of fissures with their resulting chronic inflammatory changes, is a more difficult question.

NUMBER OF CASES.

Out of 2,270 cases, 2 were under 20 years.
" " " 81 were between 20 and 30 years.
" " " 476 " " 30 " 40 "
" " " 771 " " 40 " 50 "
" " " 600 " " 50 " 60 "
" " " 258 " " 60 " 70 "
" " " 82 " over 70 years.

(Gusserow.)

PERCENTAGE PROPORTION.

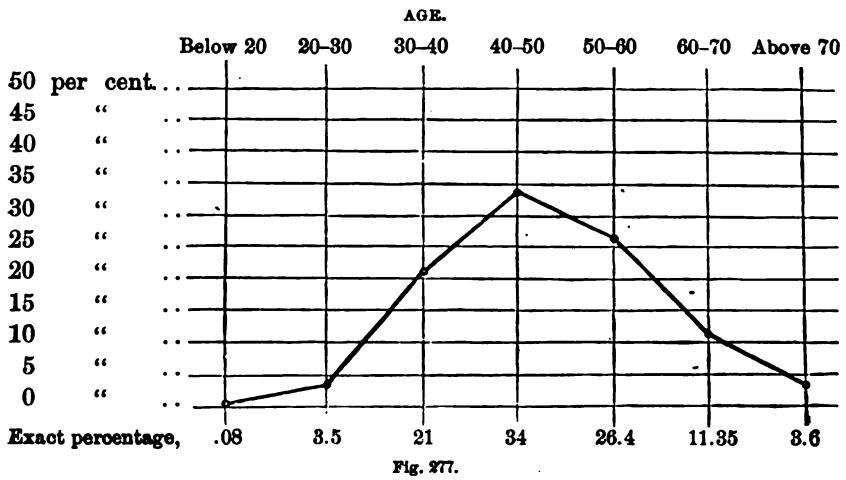

Fig. 277.

Table and diagram showing frequency of carcinoma according to age of patient.

CHAPTER XXXIX.

CARCINOMA UTERI (OF CERVIX); SYMPTOMS AND DIAGNOSIS.

LITERATURE.

See Literature of Chapters XXXVIII. and XL.

SYMPTOMS.

The *local* symptoms of carcinoma uteri are three :

Hemorrhage,
Offensive discharge,
Pain.

There are in addition a considerable number of *general* symptoms, which arise secondarily.

As a rule, however, no symptoms are present in the first stage, that is until ulceration sets in. In exceptional cases, when infiltration of the connective tissue or of the walls of the uterus has taken place at an early period, pain may be an early symptom ; there is no pain so long as the disease is limited to the cervix. This entire absence of symptoms until the disease has already made considerable progress, is the reason of the great difficulty in ascertaining the period of its probable commencement. From the same cause, the patient does not seek relief till the possibility of eradicating the disease is much diminished.

LOCAL SYMPTOMS.

Hemorrhage is usually the first symptom noticed by the patient. She observes that menstruation is more profuse than formerly.[1] This, when the disease occurs late in life, she attributes to approach of the menopause. In other cases, profuse hemorrhage occurs irregularly between

[1] Possibly, when the disease is extending along the mucous membrane of the cervix.

and independent of the menstrual periods.[1] Sometimes the hemorrhage is noticed only after exertion (as straining at stool) or after coitus. Sometimes she states that "the menstrual flow never entirely ceases;" which means that the vaginal discharge is always tinged with blood. The explanation of hemorrhage in these earlier stages is to be found in the vascularity of the stroma of the new formation. It is rich in delicate vessels which readily rupture. In the latter stages, hemorrhage is not a prominent symptom unless a large vessel be accidentally eaten into. Death from hemorrhage is rare.

The *discharge* characteristic of carcinoma is not present until ulceration has occurred. In the papillary form of epithelioma[2] (cauliflower excrescence), there is a free discharge before the growth has begun to break down; this is of a watery character, has no odour, and is due simply to the transudation of serum. As soon, however, as ulceration occurs in any of the forms, there is a discharge containing the molecular debris of the breaking down tissue which gives it a characteristic and peculiarly offensive odour. In the rapidly growing forms (medullary) of carcinoma, there is an almost equally rapid molecular death of the newly formed tissue due to fatty degeneration of the epithelial cells. In epithelioma this discharge is less marked, because there is less necrosis of tissue; but in true carcinoma, especially in advanced stages, it is quite characteristic. In fact, a diagnosis can be made merely from the odour which hangs about the person. At first the discharge is yellowish white in colour, but afterwards from the decomposition of the fatty cells it becomes of a reddish brown; if there is hemorrhage, it will be tinged with blood.

Pain is not such an important symptom as is usually supposed. Some cases run their whole course without the patient's complaining specially of pain. It is not present so long as the disease is limited to the cervix; hence it is of no use as a diagnostic of carcinoma of the cervix in its early stage, unless the cellular tissue has been at the same time involved. But

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[1] Possibly, when the disease has begun in the substance of the cervix, but has ulcerated its way to the surface; or, later, in the case of large cauliflower excrescence suddenly broken down.

[2] Though, as we have said, we have not at present a truly *pathological* classification of the different forms of carcinoma, it is convenient, *clinically*, to use the terms epithelioma and true carcinoma. By them we do not imply anything as to the origin of the disease. By epithelioma we understand those forms which begin more superficially, spread more slowly, and do not tend to involve the connective tissue.

as soon as the new growth has extended upwards to the body of the uterus or to the cellular tissue of the pelvis, pain is produced through pressure on or actual lesion of the terminations of the nerves. The character of the pain varies. It is "a dull gnawing pain localised in the pelvis or back," or "a sharp pain shooting through to the back or down the thighs to the knees;" this last is caused by simple pressure on the crural and sciatic nerves, or, in the later stages, from affection of the cellular tissue of the nerve-sheaths. Occasionally it is felt in the mammæ or other seats of uterine sympathetic pain. The intensity of the pain varies also in different cases; it is marked where there is more formation of new tissue and less ulceration, that is when there is more pressure on the nerve-endings. Thus, if there has been much deposit between the uterus and the bladder accompanied with an increase of pain, we find that the pain diminishes when the mass breaks down and a vesico-vaginal fistula is formed. We may distinguish between pain due to the development of carcinoma, and that produced by the chronic peritonitis which accompanies it when the peritoneum becomes affected; the latter produces great sensitiveness of the abdominal walls to pressure, and a board-like rigidity from reflex spasm of the muscles.

GENERAL SYMPTOMS.

In addition to these local symptoms, which are immediately due to the carcinomatous infiltration and degeneration, there are more general symptoms which arise secondarily.

First we mention *loss of flesh* and *general debility*. The patient may continue healthy and well-looking, in the early stages; sometimes, one is surprised to find that the disease is already well advanced in a patient who to outward appearance is in perfect health. But, sooner or later, the drain on the system produces great emaciation. The patient also has a careworn expression, partly from this loss of flesh and partly from the constant pain; from this expression alone, known as the "cancerous facies," the diagnosis may sometimes be made.

The wasting (marasmus) is occasioned not only by the drain of the new growth, but also by *disturbances* of the *digestive system* which arise in the course of the disease. Loss of appetite may amount to disinclination for food, and digestion is interfered with. This is produced at first sympathetically, as in other uterine disorders; but latterly it is due to gastric

catarrh, constipation, the condition of the blood (anæmia and uræmia), and the unhealthiness of the atmosphere resulting from the offensive discharges.

There is, further, *painful micturition and defecation* according to the extent to which the bladder and rectum are involved. The latter is always present, as the rectum, whenever it is distended, presses upon the carcinomatous growth. When fistulæ are produced, the urine and fæces pass per vaginam.

Pruritus vulvæ frequently results from the acrid and irritating discharge, and from the dribbling of the urine from a fistula. The *skin* acquires in the later stages a *dingy straw tint*, which when very marked is suggestive of jaundice. That disease may actually be present when there is secondary carcinoma of the liver, but this is rare. The color is due to the anæmia, or (according to Barnes) to the absorption of decomposed fecal matter (copræmia).

DIAGNOSIS.

As the patient does not seek advice till the sarcinoma has begun to ulcerate, the physical signs have by that time become well marked and the diagnosis is easy.

On making a *vaginal examination*, the finger feels the enlarged, thickened, irregular, everted lips of the cervix spreading like a mushroom in the vagina (described by Malgaigne as "champignons cancéreux"). Sometimes a distinct tumour is present, the form of which is sufficiently indicated by the term cauliflower excrescence (see Fig. 278). In other cases the finger feels an irregular ulcerated surface in the position of the cervix, soft and friable with hard and unyielding margins. The examining finger is stained with blood, and the odour of the discharge cannot fail to be recognised. If there is any doubt as to diagnosis, a fragment should be removed and examined microscopically. The appearance of a fibrous stroma with alveoli which contain irregular cells of an epithelial type with one or more large nuclei, will confirm the diagnosis of carcinoma.

The *speculum* need not be used for the recognition of carcinoma, except in its early stage or to ascertain more exactly the seat and extent of the growth. If the disease be far advanced and the diagnosis certain, the introduction of it causes unnecessary pain and hemorrhage.

The *rectal examination* is valuable, and in these cases should always be

carefully carried out. It gives us important information in two distinct classes of cases. First, in early carcinoma or in cases where there is a suspicion of commencing carcinoma, the cellular tissue of the pelvis should

Fig. 278.

Cauliflower excrescence growing from the cervix uteri (Sir J. Y. Simpson).

be carefully examined to ascertain whether any localised deposit or enlarged glands can be felt; this can be done most easily by the rectal examination. If it is desirable to introduce two fingers into the rectum or

Fig. 279.

Scraping from carcinoma of the cervix, stained with logwood, $^{250}/_{1}$; drawn by S. Delépine.

if the examination causes much pain, the patient should be narcotised. Second, in cases of advanced carcinoma where the vaginal examination is difficult on account of the hemorrhage and pain which it occasions, a more

thorough examination can be made per rectum. The finger can reach higher up than per vaginam, and thus we can ascertain the extent of the carcinomatous deposit and the size and mobility of the uterus. The condition of the rectal mucous membrane itself is observed at the same time, to ascertain whether it is already involved in the disease. In some cases the rectal examination is the only one possible, as in the case of carcinoma vaginæ represented at Fig. 275, where the deposit round the ostium vaginæ made the introduction of the finger impossible.

DIFFERENTIAL DIAGNOSIS.

The following are the most important lesions from which carcinoma is to be differentiated:

Hypertrophy of the cervix, with induration and occluded follicles;
Papillary erosion, or ectropium, with cicatricial tissue;
Syphilitic ulceration, condylomata on the cervix;
Small fibroid in the cervix, sloughing polypi;
Retained portions of placenta or membranes;
Diphtheritic inflammation of the mucous membrane;
Sarcoma of the cervix.

As regards the first two of these, it is evident that carcinoma resembles them only at an early stage. But it is precisely at this stage that a correct diagnosis is all important for treatment. We should also remember (as Ruge and Veit have pointed out) that these conditions may be at once the result of chronic inflammation and the starting-point of malignant disease. The statement of the patient that the symptoms have existed for a long time should not throw us off our guard. *In all* cases in which a patient *over forty years of age* seeks advice *with symptoms referable to the pelvis, a careful examination should be made.* We may thus accidentally discover carcinoma in an early stage, while still within the possibility of radical treatment. If the carcinomatous infiltration be general it cannot be distinguished, except by microscopical examination, from chronic induration. Spiegelberg proposed two tests: (1) the mobility of the mucous membrane over the indurated tissue below, which is lost when the disease is malignant; (2) when a sponge or laminaria-tent is passed into the cervix, the infiltrated parts do not dilate like normal tissue. It is difficult to apply these tests practically: to pronounce on the mobility of the mucous membrane, requires a tactus eruditus such as few can claim; chronic induration, as well as malignant infiltration,

prevents dilatation. In such cases, we must watch the further progress; and, if there is suspicion of carcinoma, there is no harm in excising a portion of the suspected part and submitting it to *microscopic investigation.* A careful examination per rectum of the pelvic cellular tissue should always be made as mentioned above.

A superficial ulcerating epithelioma might be mistaken for a simple erosion, but has *thickened infiltrated edges.* The latter may, however, pass into the former.

Condylomata on the cervix simulates epithelioma, but they disappear under appropriate treatment. Syphilitic ulceration produces sometimes deep excavation, even a rectal fistula. This at the first glance might be taken for carcinoma, but more careful examination and enquiry into the history of the case will remove all doubt.

Small myomata are more sharply defined than a carcinomatous nodule of the same size, because the surrounding tissue is not infiltrated.

When a small submucous fibroid or a cervical polypus has ulcerated, it presents appearances similar to an ulcerating carcinomatous nodule. The former however is firmer and fragments cannot be broken off by the finger-nail, while the latter is friable and breaks down easily.

The possibility that carcinoma may be first noticed during the puerperium should always be remembered. There should be no difficulty in diagnosing between carcinoma of the cervix and a retained portion of placenta. If the finger be passed in, it will discover whether the suspected fungus-like mass be simply lying in the cervical canal or be springing from its walls. We have seen several cases of carcinoma in patients who were supposed to be having an abortion. In the case of carcinoma of the fundus, differential diagnosis is more difficult and will be discussed under that head.

Diphtheritic inflammation of the mucous membrane may easily be confounded with ulcerating carcinoma (Schroeder). The irregular swelling of the mucous membrane and the offensive discharge tinged with blood, which are present in diphtheritic inflammation, may be suggestive of carcinoma at the time; but this superficial resemblance soon disappears.

Sarcoma of the cervix is a very rare condition. Sarcomatous tumours are softer and grow more rapidly than carcinomatous. A positive diagnosis can only be made after microscopical examination of scrapings taken from the tumour.

PROGNOSIS.

The prognosis in carcinoma is always very grave. The possibility of spontaneous cure is a disputed point. There is one apparently well authenticated case recorded by Habit.[1] Another is mentioned by Barnes,[2] in which there is some doubt as to the correctness of diagnosis. The prognosis as to the probable duration of life will depend on the extent to which the disease has already advanced and the possibility of checking its progress, or even extirpating it altogether, by operative interference. We are not yet in a position to form an opinion upon the possibility of extirpation, because the operation for this purpose is of but recent date and statistics as to the occurrence of relapse cannot yet be gathered.

As regards the duration of disease if not interfered with, there is a slight difference of opinion. This may be explained by the variable period in the course of the disease at which the symptoms appear. Sir J. Y. Simpson gives the probable duration of life after the detection of the disease as from 2 to 2½ years; Gusserow and Schroeder give it as from 1 to 1½; while, according to Fordyce Barker, it is as long as 3 years and 8 months. The statistics of H. Arnott, drawn from 57 carefully observed cases, give the duration, after the first symptom (usually a flooding), of true cancer as 53.8 weeks; of epithelioma, 82.7 weeks. We may say therefore to the patient's friends that the disease will run a course of from one to two years. It is better not to tell the patient herself what her trouble is, though its serious nature should not be disguised.

CAUSES OF DEATH.

The causes of death, arranged in the order of importance, are the following:—

Exhaustion,
Uræmia,
Peritonitis,
Septicæmia,
Hemorrhage,
Venous thrombosis.

[1] Sydenham Society's Year Book, 1864, page 401.

[2] Barnes: Diseases of Women. London, 1878.

Exhaustion, under which we include *marasmus*, is the result partly of the drain on the system and partly of the inability to take food.

The importance of *uræmia* as a frequent cause of death has only recently been pointed out. According to Seyfert,[1] in the majority of cases death results from it. It is due to the compression of the uterus, as already described under pathology. It may be acute, accompanied by coma and convulsions; more generally it is chronic, and shows itself in the dulness of the patient, occasional headache, and decreasing sensibility to pain—which diminishes suffering as the disease approaches its termination.

Peritonitis is sometimes the cause of death, but not so frequently as one would suppose; the disease is prevented from extending generally to the peritoneum by the adhesions which are formed. When peritonitis occurs, it is localised and chronic; in some cases, however, a general peritonitis is set up which proves fatal. *Perforation* may take place from the sudden giving way of adhesions; the escape of the carcinomatous debris into the peritoneal cavity produces death from shock or septic peritonitis. The preparation shown at Fig. 280 was taken from a patient in whom the immediate cause of death was *rupture of the uterus*. The case is reported and the preparation described by A. R. Simpson (op. cit., p. 276). There was carcinoma of the cervix which had contracted the lumen of the canal; the cavity of the uterus was expanded, the walls being thinned out; at the fundus "was a small perforation about the size of a pea, with thin edges," through which fluid had escaped and set up peritonitis which rapidly proved fatal.

Septicæmia suggests itself as a likely cause of death. We are familiar with it as produced in the puerperal condition: it is explained by the fact that, at that time, there is abundant means for absorption in the numerous lymphatics and the large veins which have been recently lacerated; hence, whenever septic matter is present, there is great risk of septicæmia. Similar conditions exist in carcinoma, during the progress of which the blood-vessels are eroded and their extremities bathed in putrid matter. Barnes has drawn special attention to this as a source of blood-poisoning; according to Eppinger's[2] observations its occurrence is rare, and this he ascribes to the diminution of the absorptive power of the eroded vessels.

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[1] Säxinger, Prager med. Vierteljahrsschrift, Bd. I., S. 103.

[2] Prager med. Wochenschrift, 1876, S. 210.

Hemorrhage is in very rare instances immediately fatal. As alr pointed out, though it is important as an early system, it occurs less quently and is less abundant as the disease advances. If a large vess suddenly opened into, a fatal hemorrhage may follow.

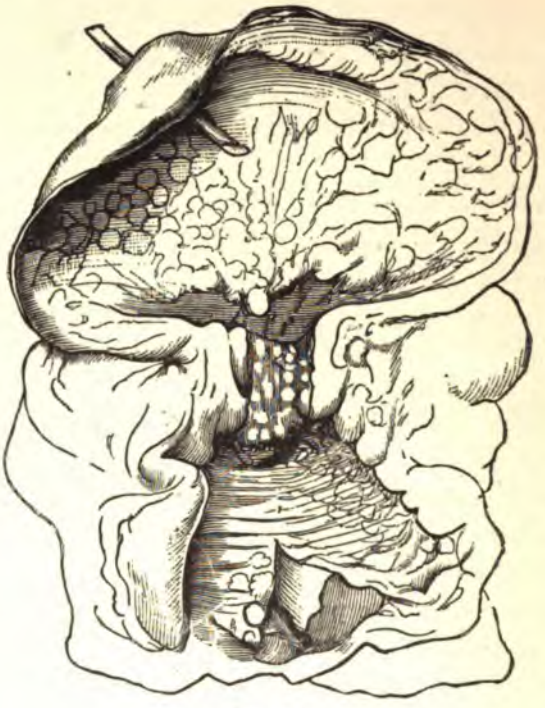

Fig. 280.

Carcinoma of the cervix leading to occlusion of os uteri, dilatation of uterus and perforation Simpson). Uterus and vagina laid open; a bristle is passed through the perforation.

Venous thrombosis, due to mechanical compression of the veins, s times occurs; and a clot may be detached producing embolism in lungs. Fatty degeneration of the heart is, sometimes, also present.

CHAPTER XL.

CARCINOMA UTERI (OF CERVIX); TREATMENT.

LITERATURE.

Barnes—Op. cit, p. 856. *Freund*—Samm. klin. Vorträge, Nr. 133; and Centralbl. f. Gyn., N. 12, 1878. *Gusserow*—Die Neubildungen, etc., S. 203. *Hegar und Kaltenbach*—Die Operative Gynäkologie, S. 391. *Schroeder*—Charité Annalen: V. Jahrgang, S. 343. Zeitschrift für Geburtshülfe und Gynäkologie: B. III., S. 419; B. VI., Heft II., S. 218. *Simpson, A. R.*—Op. cit., p. 261. *Simpson, Sir J. Y.*—Op. cit., p. 170. *Sims, Marion*—The Treatment of Epithelioma of the cervix uteri: American Journ. of Obst., July, 1879. *Thomas*—Op. cit., p. 591.

The treatment of carcinoma ought to be regarded in two aspects: first, as treatment of *the symptoms;* second, as treatment of *the disease.* Again, the treatment of the disease may be either *palliative* or *radical.*

We need not discuss here the vexed question whether carcinoma is a constitutional or a local disease. It cannot be too strongly impressed on the student that, as far as our present experience goes, in attacking the disease itself he must rely upon *surgical* and not on *medical* treatment. Our aim ought to be the removal of the disease and not merely the alleviation of the symptoms. To remove it completely we must recognise it early. Up to the present time successful treatment has been a rare occurrence, because we have failed to recognise carcinoma in its commencing stages. The possibility of treating it successfully in the future will depend on the possibility of our recognising it in its commencement. Not less important than early recognition is complete removal and that without delay. In the uterus, more readily than in the mamma, does the carcinoma get beyond the reach of the operator. In carcinoma mammæ, we can excise not only the breast but also the axillary glands if these should be already implicated. But, in carcinoma uteri, as soon as the pelvic glands are involved the case is hopeless as regards a radical cure.

We shall consider, first, the treatment of the symptoms; because, in

the majority of cases, when the patient comes under our notice, the disease itself has already got beyond our remedies.

TREATMENT OF SYMPTOMS.

These are hemorrhage, offensive discharge, pain.

HEMORRHAGE.

In the treatment of hemorrhage, there are two points to be considered; *first*, the instructions to be given to the patient; and *second*, the means which we can ourselves employ.

(1.) The patient is instructed to take the liquid extract of ergot in large doses whenever there is much hemorrhage, either during the menstrual period or independent of it. If she is subject to floodings, a friend might be taught how to give the ergotin solution hypodermically. Ice applied to the vagina and injections of cold water check hemorrhage; a small piece of sponge or tampon of wadding, soaked in perchloride of iron, might be passed into the vagina if cold is not sufficient. The patient is recommended to avoid sexual intercourse, as this favours active congestion and in some cases is the cause of hemorrhage.

(2) The means at our own command are the following:—

Simple pressure, affected by complete and thorough plugging of the vagina;

The use of styptics, caustics, or the actual cautery;

The removal of diseased tissue by the curette or other means.

The plugging of the vagina should be done whenever we are called in on account of profuse hemorrhage. The packing is carefully done with pledgets of lint or cotton wadding (with string attached) soaked in carbolic oil; the speculum is introduced carefully and not carried high up.

Of styptics, the best are the perchloride and the pernitrate of iron. Sir J. Y. Simpson recommended a saturated solution of the perchloride in glycerine. A pledget soaked in either of these is introduced, and placed so as to be in contact with the bleeding surface; and the rest of the vagina is packed, as above described, with the pledgets steeped in carbolic oil. The perchloride should be used with great caution in cases of advanced ulceration, as we have seen it corrode into the tissue so as to reach the peritoneum and produce peritonitis. The use of caustics, cautery, and curette will be considered under operative treatment.

OFFENSIVE DISCHARGE.

This is best treated by astringent and antiseptic injections. These should be used frequently, as it is important to keep down the unpleasant odour and make the patient's surroundings as comfortable as possible. If the discharge be plentiful and not very offensive, as in the cauliflower excrescence, the indication is more for the use of astringents like sulphate of alumina and iron (4 grains to the oz.). Tannin or sulphate of zinc can also be used, and it is well to change the astringent occasionally. If there is much necrosis of tissue with very offensive discharge, carbolized water (1 to 50) is required.

Acetate of lead (ʒ 1 to ℥ 20) is recommended by Barnes. Solution of bromine (1 of the B. P. solution to 3 of water) is a good disinfectant, but its odour is disagreeable. Condy's fluid is largely used, but it is only deodorant, not disinfectant. The skin round the external genitals should in all cases be protected from the acrid discharges, as the irritation is a source of discomfort. A lotion of equal parts of olive oil and glycerine, or of olive oil and lime water, applied after each vaginal injection, serves this purpose well.

PAIN.

This can only be effectually relieved by some preparation of opium ; it is well to delay the habitual use of this remedy as long as possible, as it interferes with digestion and nutrition. It may be given as a morphia suppository (¼ of a grain in each) per rectum, or as the liquor morphiæ hydrochloratis by the mouth. We obtain its action most surely and quickly and with the least disturbance of the digestive system by giving it hypodermically. It is desirable to change the narcotic, as even opium gradually loses its effect ; the hydrate of chloral, in 20-grain doses, may be used as a substitute. Various local anodynes have been suggested but are of little use.

Attention to the *general condition* of the patient is very important. The three main points are to give a sufficient quantity of nutritious and easily digestible food, to keep the bowels regular, and to have the atmosphere healthy and the surroundings cheerful. Food should be given in small quantities and frequently ; milk, eggs and beef-tea should be substituted for more solid food as soon as digestion fails. In the latter stages, the

bowels should be evacuated by enemata rather than by purgative medicines. The room should be well ventilated by day and night, and the vaginal injections repeated frequently. Gusserow recommends that during the night a piece of waterproof sheeting be tied round the patient's waist to keep away the disagreeable odour.

TREATMENT OF THE DISEASE.

As before stated, our aim here is extirpation. If complete removal be possible, carcinoma will be no longer the incurable disease which haunts the mind of the patient and baffles the skill of the practitioner. The principles of treatment can be best understood by considering the progress of the disease as consisting of three stages: (1) when the disease is present as a germ infiltrating healthy tissue; (2) when the germ as developed into a tissue having the typical carcinomatous structure; (3) when this newly formed tissue breaks down. The accompanying diagram (Fig. 281) illustrates this progress. The three stages are represented by three zones.

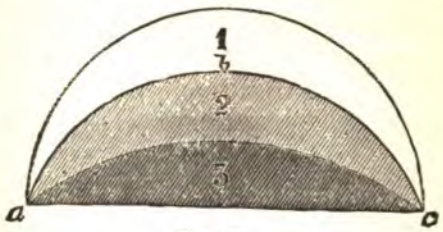

Fig. 281.

Diagram to illustrate the spreading of carcinoma. 1, healthy tissue infiltrated with germs of carcinoma; 2, carcinomatous tissue fully developed; 3, carcinomatous tissue breaking down.

The extent of zone 1 is not well defined, for we have no means, unless with the microscope, of ascertaining how far the surrounding tissue is infiltrated. The area of zone 2 is more definite; the line *a b c* is well marked, for the carcinomatous tissue when fully formed has characteristics by which it can be recognised from the surrounding healthy tissue by touch or sight. Zone 3 represents the third stage, in which the immediate danger to the patient lies. It is not the *formation* of the carcinomatous tissue which is dangerous, but its *ulceration* with accompanying hemorrhage and exhausting discharge.

From these facts we deduce the following principles of treatment. First, to effect radical cure we must remove zone 1, as well as zones 2 and 3; i.e., we must remove not only the tissue which is evidently carcinoma-

tous, but also all the surrounding tissue which may contain germs of the disease. Sometimes by a chance the operator has done this through keeping well clear of the evidently diseased part, and thus we can explain the few recorded cases of cure. *Second*, we may anticipate the natural process of breaking down, with its accompanying exhausting results and risks of a fatal hemorrhage, by destroying the newly formed carcinomatous tissue as far as it is recognisable. We shall thus save the patient from the effects of the disease until zone 1 has passed into the condition of zone 2 and is beginning to break down. Thus we explain the temporary benefit (for a period measurable by months) derived from the partial excision of the new growth. *Third*, the application of caustics alone may effect the destruction of area 2; but we are not so sure that we are removing the *whole* up to line *a b c*, as we are when we are using the knife or other cutting instrument. The latter means is preferable because we can make certain that we have reached this line in all cases where it is attainable by operative means. *Fourth*, the use of the knife and the application of caustic to the raw surface will, where the disease has spread far, be more effectual than the use of the knife alone; the caustic will now without doubt operate on the area of zone 1 and destroy so far the germs of the disease.

There are four methods of operative treatment:

1. Application of caustics.
2. Scraping out of diseased tissues.
3. Amputation of the cervix.
4. Excision of the uterus.

APPLICATION OF CAUSTICS.

This should scarcely come under the head of treatment of the disease. All that we can hope for in the application of caustics is merely a superficial destruction of the growth and consequent temporary alleviation of the distressing symptoms. The caustics which we may use are the following. *Strong nitric acid* is applied with a dossil of lint: wash and, to prevent the acid from running, carefully dry the diseased surface before the application; wash again afterwards to remove superfluous acid. An alcoholic *solution of bromine* (1 to 5) has been recommended by Routh[1] and Wynn Williams:[2] cotton wadding soaked in it is applied to the dis-

[1] British Medical Journal, February and March, 1880.

[2] London Obstetrical Transactions, vol. xii., p. 249.

eased part to produce a slough, and the rest of the vagina protected by wadding wet with bicarbonate of soda. Numerous other caustics have been tried.

The results of this method are only temporary. The superficial layers of the growth are destroyed while the hemorrhage and discharge cease for a time. Cicatricial contraction takes place on the surface, but the hard infiltration can be felt extending beyond. According to Campbell de Morgan,[1] the superficial application of caustics acts as an irritant producing increased growth of the new formation; so that when they are used they must be applied thoroughly.

SCRAPING OUT OF DISEASED TISSUE.

We have recourse to this means of treatment (1) in cases in which the disease is not of a form suitable for amputation—when it does not form a pediculated mass but is spreading along the mucous membrane of the vagina, (2) in cases which are too far advanced for amputation of the cervix. This method is good and safe in principle, because the carcinomatous tissue is soft and friable compared with the surrounding connective tissue and can be therefore easily scraped away.

Fig. 282.
Simon's sharp spoon.

The means which we employ are the curette or the sharp spoon. Sir J. Y. Simpson used to scrape out the diseased tissue with the finger-nail or the curette. The sharp spoon introduced by Simon[2] is the most efficient instrument; it should be used with short firm strokes, and the raw surface examined from time to time with the finger to feel whether all the hard nodules have been removed. After the scraping has been thoroughly carried out, the surface is burned by the actual cautery and the vagina tamponed to prevent hemorrhage. The results of this method are more satisfactory than those which follow the application of caustic alone; they depend entirely on the thoroughness with which the scraping has been done.

[1] The Origin of Cancer Considered with Reference to the Treatment of the Disease, 1872.

[2] Berlin, Beiträg. zur Geburt. u. Gyn., 1872, Bd I., p. 17.

AMPUTATION OF THE CERVIX.

This operation is called for by two sets of circumstances: (a) when the disease is as yet limited to the cervix and there is a distinct line of demarcation above, so that in operating we can cut through healthy tissues; (b) when it has spread so far that although we cannot operate upon healthy tissue, we are yet justified in removing as far as possible the projecting mass.

The means of amputation are the following:—

Ecraseur, or galvano-cautery;

Knife and scissors, followed by ligature or caustics.

I. Ecraseur, or Galvano-Cautery.

Relative Advantages.—Both of these possess the advantages that they are easy of application and cause less hemorrhage than the knife, although with the latter we can follow more certainly the line of demarcation. The ecraseur has the advantage that it is easily portable, requires no preparation, and is always ready when wanted. On the other hand, there is danger that the peritoneum of the pouch of Douglas or of the bladder may be lacerated by the chain. The galvano-cautery is inconvenient to carry about and is not always ready when wanted, but has the advantage that we do not need to draw down the uterus to apply it; in all cases of operation upon the cervix for carcinoma, the less traction that is made upon the uterus the safer for the patient. As the ordinary ecraseur (Fig. 283) has the chain in a line with the handle, the cervix must be drawn down to the vulva for the working of the instrument. This difficulty is obviated

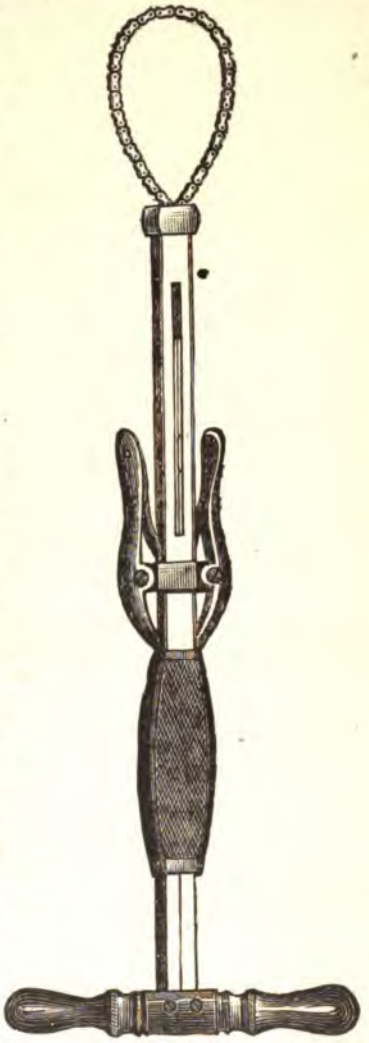

Fig. 283.

Ordinary chain ecraseur. By compressing the small side handles, the chain is allowed to run out freely. It is drawn in by a pumping motion of the large cross-handle.

in the curved instrument, and in the wire ecraseur devised by Sir J. Y. Simpson (Fig. 284). The galvano-cautery not only amputates but, at the same time, cauterises the stump; this is a questionable advantage, as, though it may diminish the probability of hemorrhage, it prevents us from examining whether all the diseased tissue has been removed.

Mode of Employment.—Put the patient under chloroform. If the curved ecraseur or the galvano-caustic wire be used, place the patient semiprone; only one assistant is necessary—to hold the Sims speculum. If the straight ecraseur is used or it is desirable to have the parts well exposed, the lithotomy posture is better; the two assistants who hold the legs can at the same time draw aside the labia with retractors, while a

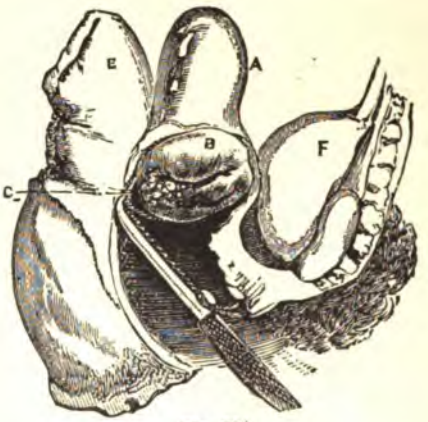

Fig. 284.

Wire ecraseur applied to cervix uteri, B; the uterus, A, is not dragged down; E, rectum; F, bladder; ecraseur relatively too small (Sir J. Y. Simpson).

third draws back the posterior vaginal wall and perineum with the Sims' speculum. Now lay hold of the cervix or tumour with the volsella, if necessary draw it down to the vulvar orifice. Place the wire or chain round the cervix or the pedicle of the carcinomatous mass (Fig. 285), as far above the limits of the disease as possible, so as to cut through healthy tissue, but not above the line of reflection of the mucous membrane of the posterior fornix upon the vaginal portion lest it should cut into the pouch of Douglas. After the ecraseur has begun to crush the tissues, *work it slowly*—shortening the loop at the rate of one notch in every twenty to thirty seconds.

In using the galvano-caustic wire place it in position cold, tighten it up so as to constrict the cervix, and then make the current. To prevent

slipping of the wire, Thomas has devised forceps with shoulders, which he uses in place of volsella. Byrne, of Brooklyn, who has had a large experience with the galvano-cautery, has pointed out that if gradual traction be made on the cervix during the action of the wire the result will be a funnel-shaped amputation; by this means more of the cervix will be removed. *Tighten the wire gradually*, so as to burn through—not cut—

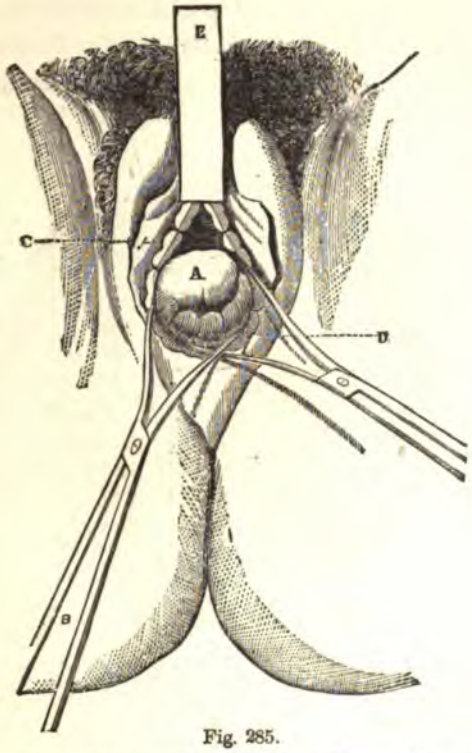

Fig. 285.

Straight ecraseur in position. A, cervix drawn down to vulva by Museux's forceps; C, D, chain; E, stem of ecraseur (Chassaignac).

the tissue. After amputation, examine the surface of the stump. If there is much hemorrhage, apply a styptic to the stump directly or on a pledget of cotton wadding, and pack the vagina with carbolised lint or wadding; this packing should not be discarded for a week or ten days, as the great after-danger is hemorrhage.

The results of this method of amputation, which is recommended by Barnes, Byrne of Brooklyn, A. R. Simpson, Thomas, and others, are so far satisfactory. Cases of complete eradication of the disease are ex-

tremely rare, and therefore the one recorded by Sir J. Y. Simpson [1] has a peculiar interest. He removed the cauliflower excrescence seen at Fig. 286—from a patient who was much reduced by the hemorrhage and discharge. Eighteen years after the operation she was still perfectly healthy, had borne five children, and had had no return of the carcinomatous growth. The diagnosis was confirmed by the microscopical examination of the tumour by Goodsir and Reid, who found it to have the structure of an epithelioma. This result is only to be accounted for on the supposition that, by a happy accident, the extent of the disease was so limited that the amputation could be made through healthy tissue. In two other

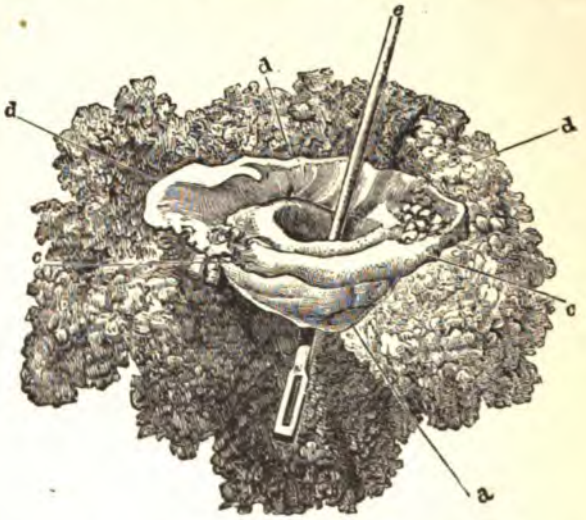

Fig. 286.

Cervix uteri amputated for cauliflower excrescence of the posterior lip. *a*, healthy anterior lip; *c*, *c*, base of anterior lip; *d*, *d*, *d*, portion of healthy vaginal mucous membrane removed along with the cervix; *e*, rod passed through cervical canal (Sir J. Y. Simpson).

cases of amputation for cancroid disease, the life of the patient was prolonged for four years after the operation; death was due in one case to acute diarrhœa, in the other to the reappearance of the disease in the mesenteric glands. Even this result is exceptionally good; more frequently it is only a matter of months till the infiltration, which was not removed on amputation, develops into fully formed carcinomatous tissue.

II. Knife and Scissors.—The advantage claimed for this method of operating is that it allows the operator to follow the line of demarcation between the diseased and the healthy tissues; if in the course of the am-

[1] Simpson: Diseases of Women, 1872, p. 180.

putation he finds the carcinomatous new formation extending higher up than he anticipated, he can remove as much more of the suspected part as may be necessary.

There are disadvantages in stitching up the wound so as to produce union by first intention. We must save enough mucous membrane to close in the wound, which would be cut away were we to leave the wound to granulate; and in this, diseased tissue may be left. Further, in the wound itself, germs of the disease may be present which would be destroyed by the subsequent application of caustic.

As examples of amputation by the knife and closure of the wound by sutures, we shall describe the method adopted by Schroeder of Berlin. According to the extent of tissue to be removed, he performs either (*a*) amputation of the vaginal portion, or (*b*) supra-vaginal excision of the whole cervix.

a. Amputation of the Vaginal Portion.—The cervix is divided on both sides with the scissors, so that distinct anterior and posterior lips are produced. A wedge-shaped portion is excised out of each of these (Fig. 163, Vol. I.) and the flaps stitched together. The lateral incisions in the cervix are then closed by sutures.

b. Supra-vaginal Excision of the whole Cervix.—1. The cervix having been drawn down with the volsella, the knife is carried through the vaginal mucous membrane of the *anterior fornix* round the base of the anterior lip into the cellular tissues below. The bladder is easily separated from the cervix almost as far as the utero-vesical pouch of peritoneum, and retracts upwards carrying the ureters with it.

2. The cervix is now carried forwards; and the mucous membrane of the *posterior fornix*, which is thus exposed, is incised in a similar way, the ends of this incision being made continuous with those of that made in the anterior fornix. The peritoneum of the pouch of Douglas is liable to injury, but this accident is not of importance. In cases where the posterior lip must be divided high up, it is better to cut into the pouch and remove the peritoneal covering along with the portion amputated.

3. The clearing of the cervix from the cellular tissue above the *lateral fornices* is more difficult, on account of the firmness of the connective tissue and the presence of large branches of the uterine artery which enter at the sides. The scissors are useful here, and any bleeding points must be ligatured.

4. The cervix being thus made free all round, the knife is carried

through its anterior wall at the desired height, *till the cervical canal is opened into.* The anterior vaginal wall is stitched to the anterior wall of the cervix (Fig. 287). This prevents retraction of the cervix while the posterior wall is cut through and the amputation thus completed. The posterior vaginal wall is now stitched to the posterior lip of the cervix. The ends of the wound in the lateral fornices are closed with sutures which, if placed deeply, also control hemorrhage. As the ureters retract, they are not in danger of being caught in the ligatures.

As regards the operation itself, Schroeder's results show that it is not a very serious one ; of thirty-seven cases, four succumbed to the operation ; one from hemorrhage, one from phlegmon, and two from peritonitis. As regards the cure of the disease, the report is not so favourable.

Fig. 287.

Line of incision and position of sutures in the supra-vaginal amputation of the cervix (Schroeder).

Of nineteen cases of which a definite report is given, thirteen had a recurrence of the disease at varying periods, of which the average is four and a half months. In three, no recurrence had been observed within a period of eighteen, nine, and eight months respectively. The report of the condition of the other three, in which there was no recurrence, is made at too short a period after the operation to justify any deduction from it.

III. With the Knife and Scissors followed by the Application of Caustics.—This is the method recommended by Marion Sims for the treatment of epithelioma of the cervix uteri. The steps in the operation are the following :

1. The epitheliomatous mass is broken down and removed with the curette, or cut away with the scissors if it is of a sufficiently firm con-

sistence. It is not merely removed as far as its base (dotted line *a*, Fig. 288), but the bed of the tumour is exsected with the knife and scissors or scraped out with the curette as far as diseased tissue is present (dotted line *b*, Fig. 288).

2. The cavity thus produced is cleaned out with sponges, and examined with the finger to ascertain that all indurated structure has been removed.

3. The edges of the cavernous opening are trimmed. The parts are sponged quite dry, and the cavity plugged with cotton-wool squeezed almost dry out of either of the following styptic solutions: liquor ferri

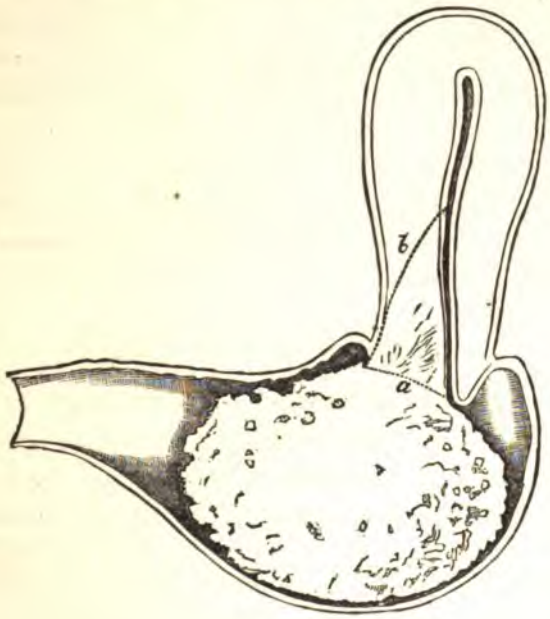

Fig. 288.

Excision of epithelioma of the cervix (Marion Sims). For letters see text.

subsulphatis (1 part to 2 of water), or solution of carbolic (1 to 40) saturated with pulverised alum (1 to 12). The upper third of the vagina is packed with the same material, and the rest with cotton wool soaked in carbolic solution.

4. After an interval of five days, this plug is removed and the caustic introduced. Pledgets of cotton-wadding soaked in a strong solution of chloride of zinc (℥ v. to ℈ j.) and wrung dry, are packed into the scraped-out cavity; the upper part of the vagina is tamponed with wadding soaked

in a solution of bicarbonate of soda. Morphia is given hypodermically to relieve the intense pain produced by the action of the chloride.

5. After another interval of five days, the cotton-wool containing the caustic is removed. A cup-shaped grayish slough will be found under it and is easily taken away. The granulating surface beneath will cicatrize in a fortnight.

The results of this method of operating are said by Marion Sims to be more satisfactory than those which follow from the use of the knife with healing by the first intention. He mentions one case in which he removed an epithelioma of the anterior lip (represented in Fig. 288) the size of a Sicily orange. A year afterwards, the operation had to be repeated to remove a similar tumour from the posterior lip. Five years after this the patient was still in good health, though smaller growths had been removed in the interval.

We are not as yet in a position to decide which of these three methods of amputation is the best. The supra-vaginal amputation of Schroeder and the method of Marion Sims, enable us to remove more diseased tissue than the infra-vaginal amputation does.

EXCISION OF THE WHOLE UTERUS.

To Freund, formerly of Breslau, is due the credit of having first thought out and carried into execution a method by which the whole uterus can be removed. This method has increased the possibility of a radical cure of malignant disease of the uterus, though the number of cases suitable for extirpation is more limited than we should have supposed. The uterus alone can be removed by it, not the glands or connective tissue in the pelvis to which the disease in the majority of cases soon spreads. But when the disease has originated in the body of the uterus, or beginning at the cervix has extended upwards into the uterus rather than into the vagina or the connective tissue, the *extirpation of the uterus* holds out the prospect of a radical cure. This may be done (*A*) by abdominal incision, (*B*) through the vagina.

A. By Abdominal Incision (Freund's method).—The following are the steps in the operation. (As a preliminary in the operation referred to in the note,[1] the cervix was stitched to check hemorrhage from the cavity of

[1] In a case in which we saw Freund operate for sarcoma uteri; the operation lasted 2½ hours. The patient made a good recorvery.—A. H. B.

the uterus.) The vagina is thoroughly washed with carbolised water, and the most careful antiseptic precautions are observed. The bladder is emptied, and the catheter left in it as a guide to its position.

1. An incision is made in the abdomen in the middle line extending downwards to the symphysis pubis and, unless the abdominal walls are unusually lax, the recti are partially divided on each side at their insertion into the pubis. The peritoneal cavity having been opened into, the intestines are drawn up out of the pelvis; if there is not room for them in the upper part of the abdomen, they are brought out and covered with a

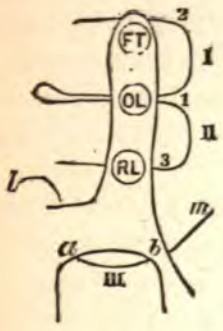

Fig. 289.

Vertical section through base of right broad ligament to show the position of the ligatures in Freund's extirpation of the uterus. The posterior aspect of the broad ligament is to the right. *FT*, Fallopian tube; *OL*, ovarian ligament; *RL*, round ligament. The end, *m*, of ligature III. has not yet been carried through round ligament. For other letters see text.

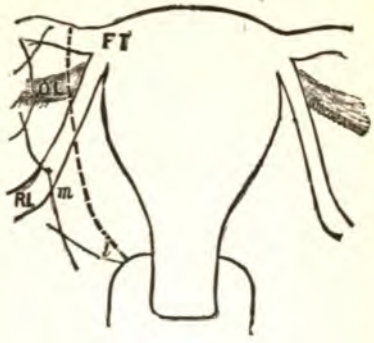

Fig. 290.

Uterus seen from the front. The ligatures shown only on the right side to correspond with Fig. 289; they are drawn through but not tightened. The dotted line is line of amputation. For letters see Fig. 289 and text.

cloth soaked in warm carbolised water. The uterus is laid hold of with forceps, of which Freund has devised a special form, and drawn upwards out of the pelvis.

2. The broad ligament is ligatured on both sides in three portions as follows. The uterus being drawn over to the opposite side to make the ligament tense, a needle armed with a double silk suture (Fig. 289, 1) is passed from behind through the ovarian ligament; the end 2 of this thread is carried through the broad ligament just below its free margin; thus loop I. is formed, which when tied in front controls the *ovarian artery*. The lower end 3 is passed through the round ligament and thus loop II. is formed, which when tied controls the *pampiniform plexus*.

The same is done upon the opposite side; the threads are not yet cut away, but drawn upwards by assistants.

The ligature III. dips into the fornix vaginæ so as to control the uterine arteries. It is passed from the vagina on a curved needle sheathed in a trocar. Guided by the hand in the vagina, the needle is made to pierce the lateral fornix (at *a*); a piece of cork pressed against the point facilitates penetration. The free end *l* of this double thread is laid hold of and held while the needle is withdrawn and, running on the thread, carries it through the lateral fornix (at *b*). The thread is then cut at *m* beyond the eye of the needle, so that the needle still threaded can be used to place a similar ligature in the lateral fornix of the opposite side. The end *m* is carried through the round ligament at the same point as 3, so as to form the ligature III. which controls the *uterine artery*. It is important that it should include but a small portion of the vaginal roof, so as to compress the artery more securely.

3. The uterus is now excised. The knife is carried through the utero-vesical pouch between the cervix and the bladder, of which latter the position is defined by the catheter. The free edge of the divided peritoneum, resting on the bladder, is fixed to the underlying tissue by a fine silk ligature. The peritoneum of the pouch of Douglas is now cut through at a lower level, and the free margin fixed in a similar manner with a fine silk thread. The cellular tissue underneath the peritoneal wound, before and behind the uterus, is separated *with the finger;* then the vaginal mucous membrane is divided in the anterior and posterior fornices with the knife passed in from the vagina. The uterus is thus free before and behind; and, the broad ligaments being cut through with the scissors internal to the three ligatures (Fig. 290), the whole organ is removed.

4. The ends of the six ligatures are brought down through the wound in the roof of the vagina. (Formerly, Freund stitched this wound carefully up; the ligatures referred to above as placed through the margin of the peritoneum—before on the bladder and behind in the pouch of Douglas—were used to bring the peritoneal edges of the wound together.) A T-shaped drainage-tube, kept in its place by a catgut suture, is laid in the wound. Any bleeding-points in the margin of the wound are secured. The abdominal incision is closed; the peritoneum with fine silk thread, the muscular layer with silver wire, and the skin with fine silk sutures.

The results of this method of extirpation (as given by Hegar and Kaltenbach, loc. cit., S. 408) are that, of 89 cases of completed operation, 26

recovered. The mortality of this operation has thus been about 71 per cent.

B. Extirpation from the Vagina.—The following is the method adopted by Schroeder of Berlin :[1]

1. The uterus being firmly drawn down to the vulva, the cervix is separated from the bladder as in the supra-vaginal amputation, but the peritoneum is not cut into. The mucous membrane of the posterior fornix is incised, and the cervix freed all round.

2. The pouch of Douglas is opened into, and two fingers of the left hand passed in over the fundus uteri into the vesico uterine pouch. By cutting down through the wound in front of the cervix upon these fingers, the peritoneum is divided anteriorly.

3. The uterus, being thus freed before and behind, is retroflexed on itself so that the fundus is forced through the wound in the posterior fornix. This was done with comparative ease in the case observed; but where the uterus is enlarged or of a firm consistence, or where the vagina is small, it can only be done with great difficulty; it is facilitated by laying hold of the fundus with forceps.

4. A needle armed with a double thread is made to transfix the broad ligament which is ligatured in two portions and an additional ligature is put round the whole. This is done on each side. It is not difficult if the ovaries and Fallopian tubes are not to be removed, as the stumps are sufficiently long for the application of the ligatures; but if they are cut away, the ligatures are apt to slip.

5. The uterus is cut away; and the pedicles examined for bleeding points, which must be secured.

6. Each pedicle is brought into the wound in the roof of the vagina, and kept in position by a suture which is passed through the edge of the wound in the anterior fornix, through the pedicle above the ligatures, and then through the edge of the wound in the posterior fornix. This also brings together the margins of the wound at each side, and the ends of the wound external to them are closed. A T-shaped drainage-tube is passed between the stumps into the peritoneal cavity. The vagina is packed with salicylic wool and the end of the drainage-tube wrapped round with the same. Should the temperature rise or the discharge be-

[1] In a case in which we saw Schroeder operate for carcinoma uteri, the operation lasted half an hour. The patient made a good recovery.—A. H. B.

come fetid, the pelvic cavity is washed out with carbolised water. The sutures are removed after an interval of from two to three weeks.

The results of this operation are as follows. Schroeder has operated in eight cases (one of these was performed by his assistant), and in one only did the patient die; the death resulted from internal hemorrhage caused by the rupture of a vessel in the broad ligament. The other seven made a good recovery. As regards the extirpation of the disease, sufficient time has not elapsed to ascertain whether or not it will return. The total results are (according to Hegar and Kaltenbach) that, of 29 completed operations, 21 recovered. The mortality has been therefore only 27.6 per cent., which contrasts favourably with that in Extirpation by Abdominal Incision (71 per cent.).

CHAPTER XLI.

CARCINOMA OF THE BODY OF THE UTERUS.

LITERATURE.

Breisky and Eppinger—Prager Med. Wochenschrift, 1877, S. 78. *Gusserow*—Neubildungen des Uterus: Stuttgart, 1878, S. 222. *Schroeder*—Op. cit., S. 295. *Simpson, Sir J. Y.*—Selected Obstetrical and Gynecological Memoirs, Edited by Dr. Watt Black, p. 769. *Veit*—Zeitschrift. für Geburts. und Gyn., Bd. I., S. 467.

PATHOLOGY AND ETIOLOGY.

Carcinoma affects the body of the uterus much more rarely than the cervix; in only 13 out of 686 cases of uterine cancer, that is in rather less than 2 per cent., was the disease situated in the body of the uterus (Schroeder).

Its rarity is apparent from the fact that Gusserow, after a careful survey of the whole literature, has collected but 80 cases.

As in the cervix, the disease originates either in the substance of the walls of the uterus or in the mucous membrane. In the former case, it begins as localised nodules which grow rapidly and produce bulging of the mucous membrane or of the peritoneal coat but do not tend to ulcerate. When in the mucous membrane it causes a uniform swelling or, more usually, projects in polypoidal masses (Fig. 291).

By Eppinger and Ruge the disease has been directly traced to the epithelium of the uterine glands; these first hypertrophy, and then their proliferating epithelium passes into carcinomatous epithelial cells. The new-formation ulcerates, so that the wall of the uterus becomes converted into an excavated surface with a hard base. Adhesions rapidly form with neighbouring organs, while secondary deposits may develop in the peritoneal cavity.

As to *Etiology*, what has been said of carcinoma of the cervix applies here with two additional facts. (1) The maximum number of cases is

between 50 and 60 years, a decade later than in the cases of carcinoma of the cervix (*v.* Fig. 277). Out of 34 cases, 23 occurred during these

Fig. 291.

Carcinoma of the body of the uterus. The uterine cavity is increased in size but the cervix is undilated (Sir J. Y. Simpson).

years (Pichot). (2) A surprisingly large proportion of the cases are in nulliparæ (Schroeder).

SYMPTOMS AND DIAGNOSIS.

Again, as in carcinoma of the cervix, the symptoms are pain, hemorrhage, and fetid discharge. 1. Pain, in contrast with carcinoma of the cervix, is always an early symptom. It occurs periodically; "slight and intermittent, perhaps, at first, but soon reaching a high pitch of intensity, at which it continues for an hour or two, and then gradually subsides" (Sir J. Y. Simpson). 2. *Hemorrhage* is also present at an early stage; it takes the form of profuse menorrhagia, because the mucous membrane from which the menstrual flow takes place is diseased. 3. *The discharge* is usually profuse and becomes after a time fetid. Sometimes it is watery and not offensive; in rare cases is it altogether absent.

On vaginal examination, the cervix is found to be either normal or dilated. The uterus is enlarged, and may be freely movable or may be fixed by adhesions. The sound shows the cavity to be enlarged and may recognise irregularity of the mucous membrane; its introduction is followed by hemorrhage. The condition of the mucous membrane is more

precisely ascertained by examination *with the finger after dilatation of the cervix* with a tent. In the majority of cases, certainty of diagnosis is possible only through *microscopic examination* of fragments removed by the curette. Should these show merely hypertrophied glands, we must remember that this is sometimes a transition stage to malignant disease. Typical carcinomatous cells are seen at Fig. 279.

The *Differential Diagnosis* must be made from—

Portions of retained placenta,
Sloughing submucous fibroid,
Hemorrhagic endometritis.

These conditions have been already described. As to the first of these we note that carcinoma sometimes develops during the puerperium. In three cases observed by Chiari, the development of carcinoma was directly connected with the puerperium and ran a rapid course to a fatal termination within six months after the birth of the child.

During the period of sexual activity, differential diagnosis is often extremely difficult; rapid growth and development of peritonitis fixing the uterus, point to malignant disease. After the menopause, the recurrence of hemorrhage is an important diagnostic. The microscope is, when available, the most reliable guide.

TREATMENT.

As to the treatment of the symptoms, this is the same as in carcinoma of the cervix (*v.* Chap. XL.). As to the treatment of the disease, the scraping away of the polypoidal masses with the curette or sharp spoon gives temporary relief from the hemorrhage and discharge. The only hope of cure lies in extirpation of the uterus. These cases are more favorable for extirpation than cases of carcinoma of the cervix, as there is a better prospect of excising the whole of the affected tissue.

CHAPTER XLII.

SARCOMA UTERI.

LITERATURE.

Clay, J.—On Diffuse Sarcoma of the Uterus: *Lancet*, Jan., 1877. *Galabin*—Lond. Obst. Trans., Vol., XX. *Gusserow*—Die Neubildungen des Uterus: Stuttgart, 1878, S. 142. *Jacubash*—Vierfälle von Uterussarcom: Zeitschrift f. Geburts. u. Gyn., Bd. VII., Hft. I. *Kunert*—Ueber Sarcoma Uteri: Arch. f. Gyn., Bd. VI., S. 29. *Rogivue*—Du Sarcôme de l'utérus: Inaug. dissert., Zürich, 1876. *Schroeder*—Op. cit., S. 301. *Simpson, A. R.*—Op. cit., p. 240. *Thomas*—Op. cit., p. 566; and Sarcoma of the Uterus, Lond. Obst. Journ., Vol. II., 1875, p. 437. *Virchow*—Die krankhaften Geschwulste: Bd. II., S. 350. For a full *résumé* of the literature, see Gusserow and A. R. Simpson.

By sarcoma we understand a *connective-tissue* tumour of an embryonic type (Cohnheim). As we trace back carcinoma to the epithelium and true myoma to the muscular fibre, so we trace back sarcoma to the connective-tissue.

For the recognition of sarcomata as of connective-tissue origin and the limitation of the term to malignant tumours of this type, we are indebted to Virchow. Formerly they were known in English literature as "recurrent fibroids;" the existence of this form of tumour in the uterus was recognised and fully described by Hutchinson (1857).

PATHOLOGY.

Unlike carcinoma, sarcoma rarely occurs in the cervix; in the larger proportion of cases it is in the *body* of the uterus.

It occurs in two forms:

1. Diffuse sarcoma of the mucous membrane;
2. Circumscribed fibrous sarcoma.

The *diffuse sarcoma of the mucous membrane* arises from the sub-epithelial connective tissue. It appears as a general swelling of the mucous membrane which becomes soft and crumbly, or as irregular foldings or

knobby projections into the uterine cavity; sometimes these projections have a polypoidal and apparently circumscribed character (Fig. 292) so that this form passes insensibly into the fibrous. The masses have a grayish-white brain-like appearance and soft pulpy consistence. The mucous membrane may be broken down but is not deeply excavated as in carcinoma. On microscopic examination the mucous membrane is seen

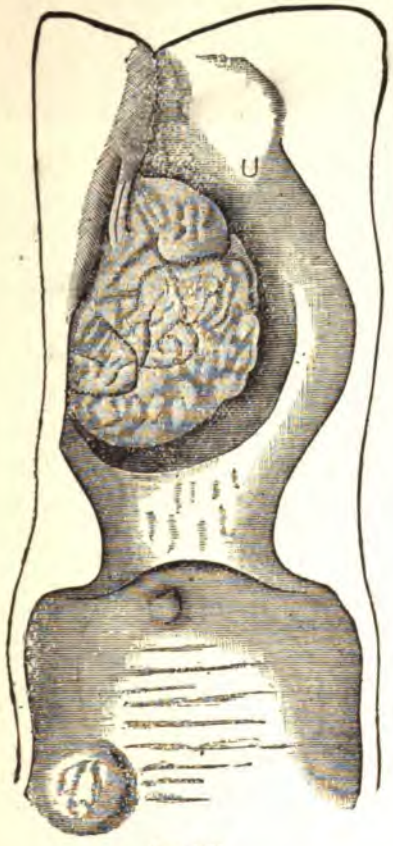

Fig. 292.

Sarcoma uteri with tumours in the vagina—from a specimen in the Pathological Institute at Strassburg (Gusserow).

to be infiltrated with masses of closely-set round cells, more rarely spindle-cells. Epithelial-cell proliferation often complicates this form of sarcoma and brings it into close relation to carcinoma. Klebs has proposed to call such forms carcino-sarcomata.

The *circumscribed fibro-sarcoma* arises in the muscular coat; like the fibroid it may be submucous, interstitial or sub-peritoneal and is found

usually in the body, rarely in the cervix. The tumours are of a firm consistence, and feel like knots in the muscular wall of the uterus or project as polypi into its cavity; they thus resemble small fibroids, but *have no*

Fig. 293.

Microscopic section of the mucous membrane of the uterus in a case of sarcoma (Schroeder). *s*, sarcomatous tissue; *c*, small celled infiltration; *g*, uterine glands.

capsule. Microscopically they consist of a localised sarcomatous—generally round-celled—infiltration (Fig. 293).

In some cases it can be shown that sarcoma is a *degeneration of a fibroid tumour*, as in the following specimen described by A. R. Simpson:

"On section it presented a uniformly smooth surface of pale pinkish colour, with some islands in it presenting the familiar cotton-ball structure and clear white glistening aspect seen on section of an ordinary fibroid

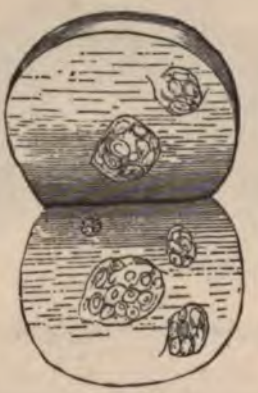

Fig. 294.

Sarcoma uteri, seen on section, showing fibroid nodules (A. R. Simpson).

tumour of the uterus, and separated from the softer surrounding tissue by a connective-tissue capsule (Fig. 294). The larger part of the tumour was composed of fusiform nucleated cells, with an intercellular matrix

having a fibrillated appearance, and running for the most part in small sections in parallel directions." A portion of the tumour, probably then a fibro-myoma, had been removed five years previous to this; a third portion of the tumour, removed four years subsequent to this, showed only sarcomatous tissue.

Chrobach, Müller and others have traced the development of sarcoma in tumours which were originally undoubted fibroids. There is therefore no doubt that this is one mode of origin of fibro-sarcoma; whether (as Schroeder and Kunert have suggested) this is always the origin, is as yet undecided.

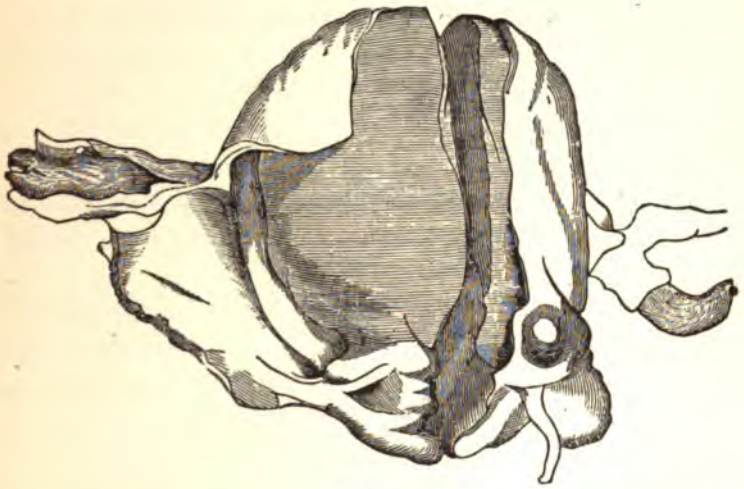

Fig. 295.

Sarcoma uteri invading the Fallopian tubes and projecting from their fimbriated ends (A. R. Simpson).

Secondary nodules may form in the vagina (Fig. 292) and peritoneal cavity. Sometimes the peritoneum is affected by continuous spreading of the new growth outwards towards the peritoneal covering; here it causes adhesions, through which the sarcomatous infiltration may extend to other organs (Gusserow). A. R. Simpson records a unique case in which the infiltration spread along the mucous membrane of the Fallopian tubes (Fig. 295) so that from their fimbriated ends there projected "rounded masses having the appearance of the thrombus projecting from a small vein into a larger trunk." The uterus was of the size of a four-months pregnancy.

A. R. Simpson draws attention to the frequency of *inversion of the uterus* as the result of sarcoma. We referred to it as a rare complication

of pediculated submucous fibroid tumours. In sarcoma, it appears to occur more frequently—in 4 out of 48 cases. He attributes this to the paralysis of the muscular wall of the uterus through sarcomatous infiltration and to the peculiar dilatability of the cervix observed in some cases.

Sarcomata may undergo *mucoid degeneration*, resulting in a myxo-sarcoma. Large vascular spaces may form in their substance—as occurs in fibroid tumours; in a case recorded by Jacubash, the bursting of such a vascular tumour into the peritoneal cavity proved suddenly fatal.

Metastatic deposits, though rare, are found more frequently in fibro-sarcoma than in diffuse spreading scarcoma. They have been found in the lymphatic glands, lungs, liver, and vertebræ.

ETIOLOGY AND FREQUENCY.

Of the reason why a source of irritation should lead the connective tissue to produce a sarcomatous new formation, we know as little as why the same cause produces a carcinomatous new formation from the epithelium.

As to its frequency, a sufficient number of cases has not yet been collected to form any generalisation. It is, however, so rare that every carefully observed case which has been authenticated by microscopic examination should be placed on record. Up to 1878, Gusserow had collected 63 cases; since that time Jacubash has collected 9 additional cases from German sources, Galabin has reported a case of sarcoma of the cervix, and we have seen two cases since 1879 in Professor Simpson's ward—one in the body of the uterus and the other in the cervix.

Age has the same predisposing influence as in fibroma and carcinoma. Of 62 cases collected by Gusserow—

2 were under 20,
3 " between 20 and 30,
14 " " 30 " 40,
26 " " 40 " 50,
14 " " 50 " 60,
2 " " 60 " 70,
1 was above 70.

The number of sterile patients among those affected with sarcoma (25 out of 63) is noteworthy; in this respect it contrasts with carcinoma (Gusserow).

SYMPTOMS.

The following symptoms characterize the early stage, in which the patient seeks advice:

1. Hemorrhage.
2. Absence of pain.
3. Watery non-offensive discharge.
4. Cachexia.

Hemorrhage appears first as increase of the menstrual flow, or as irregular hemorrhages after the menopause. As the new formation *does not ulcerate* rapidly like carcinoma, the increased menstruation is due to hyperæmia of the mucous membrane (Clay).

The *absence of pain* in the early stage is remarked on by Clay and A. R. Simpson; in this respect it differs from intra-uterine cancer. According to Gusserow, on the other hand, pain is frequently present and that of an intense and rending character. This apparent discrepancy of opinion may be explained by the varying progress of the infiltration. In the spreading of carcinoma, we noted that pain was most severe when the disease was extending upwards and compressing the nerve-endings in the uterus and connective tissue; when it grew down into the vaginal cavity, it was painless.

The free rice-watery discharge has a slight odour but is not nearly so offensive as in carcinoma; this is due to the fact that there is not the same rapid ulceration and necrosis of tissue. When the disease has progressed further, the discharge becomes equally fetid. The presence in the discharge of *grayish-white shreds*, like particles of brain matter, is diagnostic; under the microscope these are seen to consist of small portions of the neoplasm.

Cachexia is of importance as it helps us to distinguish developing sarcoma from a non-malignant polypus; the drain from the latter may make the patient gradually anæmic; but there are not the loss of flesh, the loss of appetite and the rapid failure of strength which point to malignant disease.

DIAGNOSIS.

If the tumour projects through the os, the diagnosis is not difficult. The age of the patient with the symptoms given above and the existence of a *soft friable* pediculated tumour which springs *from the body* of the

uterus, will point to the diagnosis; a portion, detached with the nail, shows the characteristic microscopical structure. When nothing projects through the cervical canal, we try to dilate it with the finger, or, if this fails, with a sponge-tent or the rapid method described at page 129. The finger recognizes a soft friable condition of the mucous membrane, or a distinct polypoidal tumour, or a localized thickening in the walls.

The uterus is in some cases distinctly enlarged and may reach half-way to the umbilicus or lie retroverted; in the early stages it is movable, but it soon becomes fixed.

The sound shows the cavity to be enlarged; its use causes hemorrhage and even flooding.

Fig. 296.

Scrapings from a fibroid tumour to show the size and form of the muscular fibre, their rod-shaped nuclei—stained $^{250}/_{1}$; drawn by S. Delépine.

The differential diagnosis is here often very difficult, as these conditions are also present in—

Chronic endometritis (hemorrhagic type),
Small fibroid tumours (interstitial or polypoidal),
Carcinoma.

Curetting the surface with microscopic examination of the scrapings, will help us in the first case.

The removal of the polypoidal mass, with the finger-nail or nail-curette, will enable us to examine its nature; the possibility of both conditions being present, polypoidal fibroid + commencing sarcomatous degeneration, must be remembered. With an interstitial thickening, we can only watch the progress of the case.

In carcinoma of the fundus, there is generally excavation of the uterine

wall and the base of the ragged surface is harder than in sarcoma. The examination of scrapings is not always decisive, as the cells found in sarcoma sometimes closely resemble epithelial cells.

Fig. 297.

Scrapings from a spindle-celled sarcoma to show the larger size of the spindle-cells and their oval nuclei—stained $^{250}/_{1}$; drawn by S. Delépine.

In all cases of doubt we must watch for a few months, when the *rapid growth* of the tumour or the *development of cachexia* will clear up the case.

PROGNOSIS.

The prognosis is grave. Compared with carcinoma, its development is not so rapid nor are the symptoms of pain and offensive discharge so aggravated in the early stage. In two of the cases recorded by A. R. Simpson the patient survived for four years after the diagnosis of sarcoma was made out, and Gusserow mentions a case where the course was prolonged for ten years.

The temporary relief procured by removal is longer of duration than in carcinoma. No case of radical cure is, as far as we know, recorded; after removal it reappears at periods varying from two to fourteen months (Clay). When it returns, the development of the new tumour is more rapid than that of the first growth.

As to the communication of the prognosis to the patient and friends, see under Carcinoma.

TREATMENT.

The tumour should be removed as soon as we suspect malignancy. Even when there is doubt, its removal will clear up the case.

The cervix should be well dilated so as to allow the finger to pass freely into the uterus. Gradual dilatation is preferable; injury of healthy mucous membrane in dilating or curetting should be avoided, as sarcomatous cells have become engrafted on a fresh wound surface.

When circumscribed and polypoidal, remove it with the finger-nail or nail-curette. After its removal apply carbolic acid thoroughly to its base.

When diffuse, curette the uterus. Continue the scraping till all the loose tissue and irregularities of the mucous membrane are removed. After curetting the surface of the uterus, examine with the finger to ensure that all is removed and apply carbolic acid freely. When the os is widely dilated and the seat of the growth low down, cauterisation with Paquelin's cautery would be even more effectual. Clay injected perchloride of iron after curetting, and without any bad results; the application of the caustic on a rod is safer.

Extirpation of the uterus offers the only hope of radical cure (*v.* p. 166).

SECTION VI.

AFFECTIONS OF THE VAGNIA.

These we shall consider in the following order :—

Chapter XLIII. Atresia Vaginæ.

" XLIV. Inflammations of the Vagina ; Vaginismus ; New Formations.

CHAPTER XLIII.

ATRESIA VAGINÆ.

LITERATURE.

Barnes—Op. cit., p. 219. *Breisky*—Die Krankheiten der Vagina: Stuttgart, 1879. *Delaunay*—Étude sur le cloisonnement transversal du Vagin, etc.: Paris, 1877. *Dohrn*—Angeborne Atresia vaginalis: Archiv. für Gynäk., X., 3. *Emmet*—Op. cit., p. 202. Congenital Absence and Accidental Atresia of the Vagina, etc.: Trans. Am. Gyn. Soc., II., p. 437. *Puech, A.*—Des Atrésis complexes des voies génitales de la Femme: Ann. de Gynécolog., Paris, 1875. *Simpson, Sir J. Y.*—Op. cit., p. 256. *Simpson, A. R.*—Op. cit., p. 195. *Thomas*—Op. cit., p. 220.

Atresia (ἀ-τρῆσις, non-perforation) has been already defined as occlusion of the genital tract where the obstruction is complete and leads to accumulation of menstrual blood or mucous secretion. This occurs at three places—the *hymen*, the *vagina*, and the *cervix uteri*. Atresia of the *cervix* has been already described (*v.* Vol I., Chap. XXIV.). Accumulation of blood in one half of a *septate uterus or vagina* will be considered by itself at the end of this chapter.

PATHOLOGY.

1. Atresia Hymenalis.—The structure of the normal hymen has been already described (Vol. I., page 7). In atresia hymenalis it forms a continuous membrane, is thickened and of an almost cartilaginous toughness; this explains the rarity of spontaneous cure by rupture of the membrane. This condition is produced by the occurrence of inflammatory adhesion of the folds after their formation, that is after the nineteenth week of fœtal life. When the vagina is distended with menstrual blood, the hymen bulges forwards. As the menstrual blood accumulates, the vagina distends so as to form a tense membranous-walled sac nearly filling the pelvis with a smaller firmer body (the undilated uterus) rising from its upper surface (*v.* Fig. 300). If the tension be not relieved, the cervix

next becomes dilated and may rupture. Finally the uterus itself becomes opened out, though this does not occur till late.

During this period accumulations of blood may take place in the Fallopian tubes in the form of diverticula, usually situated towards the fimbriated end (Figs. 298 and 299). These are not produced, as we should suppose, by a simple reflux of the blood from the distended uterus into the tubes, but by hemorrhage from the mucous membrane of the tubes themselves (Schroeder); the uterine end of the Fallopian tube is some-

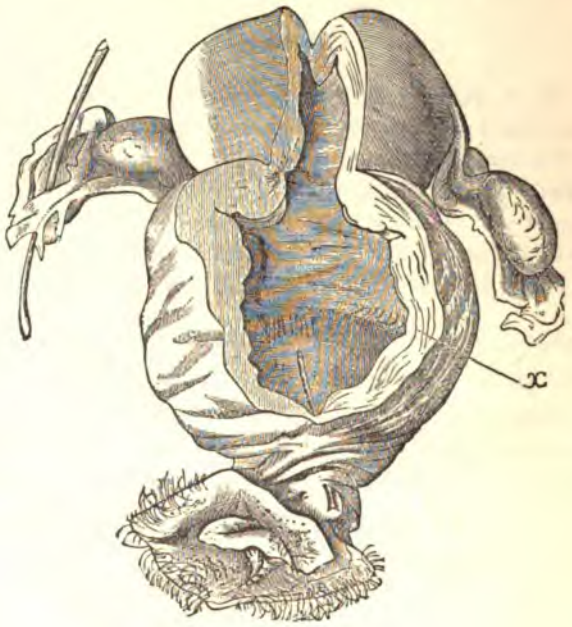

Fig. 298.

Atresia vaginæ, seen from behind. Thickness of obstruction (through which a probe is passed) 3–4 mm.; of vaginal wall below atresia 2–3 mm., *above it* (*at x*) 6 mm. Dilatation of the body of the uterus is small compared with the common cavity formed by cervix and upper portion of vagina. Left Fallopian tube markedly dilated, with no distinct flexion on it, and changed at its free end into *a thin-walled blood-sac which had burst*. Right tube undilated (Breisky).

times undilated or even entirely closed. Blood may escape gradually from the fimbriated end of the tube, and set up a localised peritonitis matting down the tube and uterus; a hæmatocele is sometimes thus produced.

2. Atresia Vaginalis.—The *thickness of the obstruction* varies in different cases, according to the extent of the original obliteration and the thinning produced by the pressure from above. The *dilatation of the vagina*

above the obstruction is remarkable ; it may form a tumour filling the pelvis, pressing on the bladder and rectum, and raising the uterus above the brim ; the walls become *hypertrophied* as is well seen in the preparation represented in Fig. 298, taken from a patient who died on the same day as the operation for atresia was performed.

The *seat of the obstruction* is most frequently in the *lower third* of the vagina. This condition may be mistaken for imperforate hymen ; as the wall of the sac, bulging through the hymeneal orifice, becomes adherent

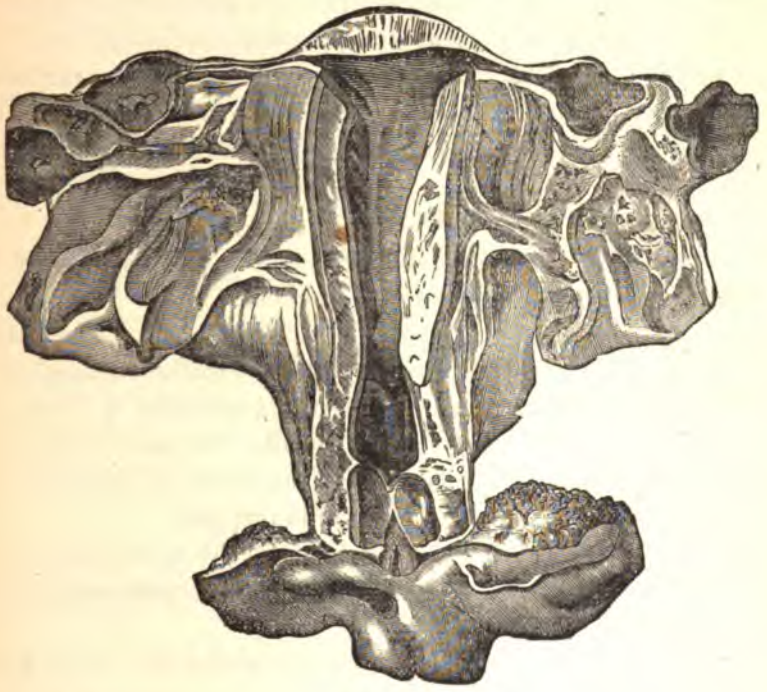

Fig. 299.

Case of double atresia. The *lower* affects the hymen and was *acquired ;* above this was a cavity one inch long, which contained purulent debris ; the *upper* obstruction was one inch thick and was *congenital ;* above it is the dilated uterus and cervix. The Fallopian tubes contain blood sacs with small rents in their walls (Breisky, case reported by Steiner).

to the hymen which appears as a mere fringe on the bulging membrane. There is not, however, the same distention of the vulvar orifice and perineum as in atresia hymenalis. *Atresia of the whole vagina* is usually associated with imperfect development of the uterus (Breisky).

Atresia may exist at more than one point in the vagina. The specimen represented in Fig. 299 illustrates this. It has this further interest that

the lower atresia—at the vaginal orifice—was *acquired*, the result of a fall on a block of wood when the patient was two years old ; the upper atresia was *congenital*. The accumulation of menstrual blood in the upper sac called for operative interference when the patient was seventeen years of age. The lower sac contained purulent matter. On the fifteenth day after the operation, death occurred from septic peritonitis.

The character of the *retained menstrual blood* is peculiar. It is of a brownish, chocolate-red colour, of a thick treacle-like consistence, and contains no coagula. Microscopically, it shows shrivelled red blood-corpuscles, flat epithelial cells, mucous corpuscles, extravasated blood-pigment, and granular debris. The mucus prevents coagulation ; part of the fluid portion is probably reabsorbed, since the quantity removed is less than the sum of what we should expect from the successive periods passed (Puech).

ETIOLOGY.

1. Atresia may be *congenital*, due to non-development of a part of the canal or its subsequent closure during fœtal life.

Atresia hymenalis implies that the hymeneal folds were developed (at the 19th week), but afterwards became blended into a continuous membrane.

Atresia of the vagina just behind the hymen is, according to Dohrn, due to the fact that (at the 18th week of fœtal life) the walls of the genital canal become closely approximated behind the site of the hymen, so that closure of the vagina is especially favoured in that part.

Atresia of the middle or upper third implies the development of the ducts and their coalescence into a vagina, with a subsequent occlusion due perhaps to inflammation (Breisky).

Complete absence of the vagina or its representation by a fibrous cord is due to the non-development of the ducts of Müller ; *absence of the lower third* is occasioned by the non-extension of the ducts downwards so as to open into the cloaca.

2. Atresia is also *acquired ;* that is, it arises during life. The most important causes which produce this condition are the following :—

Sloughing and subsequent cicatrisation after labour ;

Sloughing from impaired vitality in typhus, scarlet-fever, small-pox, and cholera ;

Cicatrisation after injuries received in childhood ;

Superficial inflammation of the mucous membrane, leading to adhesion of apposed surfaces.

The commonest form of congenital atresia is due to imperforate hymen; of acquired, is due to cicatrisation of the upper part of the vagina and cervix after labour.

SYMPTOMS.

As congenital atresia is productive of bad results only in so far as it impedes the menstrual flow, symptoms do not arise till puberty. Should menstruation not take place at puberty, the condition may not attract attention till the patient enters married life. Cases are, however, on record in which the accumulation of mucus has called for operative interference even in childhood; and it is good practice to incise the hymen in the newly-born infant if we observe that it is imperforate.

At puberty the patient experiences menstrual molimina without the appearance of a discharge. As the vaginal sac distends, pain is felt in the pelvis at first only at the periods and then more continuously. With this there is also constitutional disturbance. The periods of suffering become more protracted, the intervals of relief shorter. When the dilated vagina presses on the bladder and rectum, it causes difficulty in micturition and defecation. The abdomen swells and this, with the amenorrhœa, causes suspicion of pregnancy which is sometimes the occasion for seeking advice. If the case is left to itself it terminates fatally through rupture of the uterus or cervix (usually the latter) or of a blood-sac in the Fallopian tube, or through a simple or septic peritonitis independently of rupture. In some cases, the obstructing membrane has given way by rupture (in acquired atresia) or sloughing (in the congenital form). But even this is not a favourable termination, as the risks consequent on operative interference are still more likely to ensue when the hymen ruptures of itself.

DIAGNOSIS.

The importance of physical diagnosis will be evident from the following case. "A. B., æt. 16, unmarried, has for twelve months suffered from pain in the pelvis and back, with occasional acute exacerbations accompanied by nausea and vomiting. She has been treated for inflammation; and mercurial ointment had been applied to a swelling which had appeared in the left groin, on the supposition that it was an enlarged gland." Examination per rectum showed a condition similar to that seen at Fig. 301; the swelling in the left groin was the elevated uterus.

The practitioner will often ask himself whether a vaginal examination is necessary. On the patient's returning several times and there being nothing in the constitutional state (phthisis, chlorosis) to explain the amenorrhœa, tell the friends that there is no apparent cause for the non-appearance of menstruation except on the supposition of a mechanical obstruction to its outflow. If there be pain in the pelvis and marked constitutional disturbance, the reasons for demanding an immediate examination will be evident. The conditions found in the various forms of atresia will be easily understood by studying Figs. 300 to 303. The external genitals are first examined; a wide urethral orifice may be mistaken at first glance for the vagina, as in *atresia hymenalis* the urethral orifice is more patulous than it is normally (Oldham); the hymen is seen

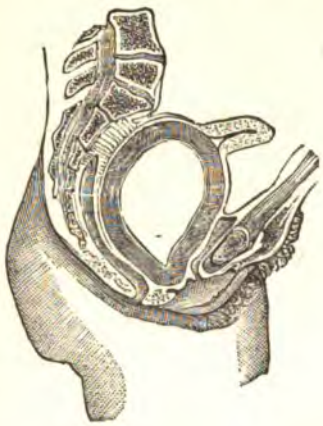

Fig. 300.
Atresia hymenalis (Schroeder).

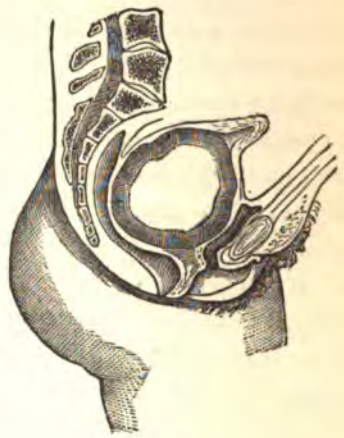

Fig. 301.
Atresia vaginæ—lower third (Schroeder).

bulging forwards at the ostium vaginæ. The finger is passed into the rectum and feels that the anterior wall is made to bulge inwards by a tense elastic sac. On bimanual (recto-abdominal) examination, this sac is felt to be equally distended and to fill the pelvis; it may extend into the abdomen as far as the umbilicus. The feeling of the sac is quite characteristic and is compared to that of a tense india-rubber ball (Schroeder); on its upper surface, the uterus is felt as a small firmer tumour.

In *atresia vaginæ* the condition is the same, except that the hymen does not bulge and that the sac does not extend so low down.

Atresia of the cervix (Figs. 302, 303) might be mistaken for early pregnancy; as the amenorrhœa and the distended uterus are present in

both cases. But the condition of the cervix, the form of the uterus, and specially the characteristic tense feeling of the tumour, enable us to distinguish it from a pregnant uterus. Malignant tumours (sarcomata) have a similar elastic consistence, but with them we should not have amenorrhœa.

It is not in all cases easy to say whether the atresia be congenital or acquired. The existence of other malformations would favour the former view, of cicatrices beside the obstruction the latter. There will also be a greater thickness of tissue felt between the urethra and rectum in the acquired form, corresponding to the obliterated vaginal canal.

Fig. 302.
Atresia of cervix at os externum (Schroeder).

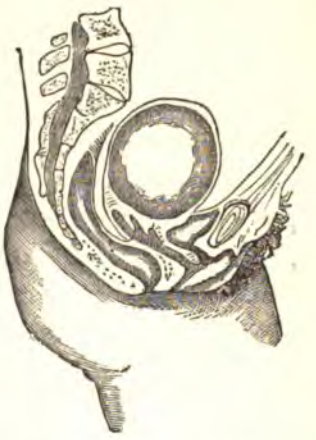

Fig. 303.
Atresia of the cervix at os internum (Schroeder).

In atresia vaginæ it is important to estimate the distance to which the atresia extends, so that we may know how much tissue we must cut through to reach the sac or the cervix uteri. This is best done by passing the index finger into the rectum till the tip is on the place where the bulging of the sac begins or where the projection of the cervix is felt; the thumb is at the same time passed into the ostium vaginæ till it reaches the obstructing membrane; the thickness of the latter can thus be ascertained.

PROGNOSIS.

If menstrual blood be accumulating, the prognosis is always grave. In atresia of the hymen the prospect of cure by operative treatment is more hopeful than in congenital atresia of the vagina. In acquired atresia

of the vagina, if the obstruction be removable, the prognosis is favourable. The unfavourable cases are those in which the vagina is partially or not at all developed; the prognosis as to curability by operation depends on the thickness of the tissue between the urethra and the rectum, which determines the possibility of opening up a vagina.

When menstrual blood has accumulated, while explaining to the patient's friends the necessity of immediate operative treatment, we should inform them also of the dangers attendant on the operation—the immediate danger of rupture of a blood-sac in the Fallopian tube, the more remote of simple or septic peritonitis.

TREATMENT.

The treatment consists in the formation of a channel to allow the menstrual blood to escape; in the case of imperforate hymen this is easily done by incising the membrane, but in atresia vaginæ we have to construct a new vaginal canal. Two dangers associated with this operation must be kept in view. *First*, too rapid collapse of the sac may lead to rupture of the Fallopian tubes or of vascular adhesions round the uterus. This rupture may be brought about in the following way, as has been shown by post-mortem examination. The Fallopian tube has been previously bound down to the side wall of the pelvis by adhesion; when the sac is opened into, the uterus necessarily follows its retreating wall and, if this retreat takes place rapidly, the tube is exposed suddenly to a strain which ruptures it; death results from hemorrhage or peritonitis. To prevent this accident, the operator should allow the contents of the sac to escape slowly and should on no account apply pressure from above to hasten the process. *Second*, the operation is frequently followed by septicæmia. To prevent this, antiseptics should be used. Listerism cannot be carried out here; but by washing out the sac carefully with carbolised water, preventing the entrance of air, and allowing free drainage when fluid collects, we greatly diminish this risk.

A third danger, which follows some time after the operation, is the contraction of the new canal which, unless specially guarded against, may lead to its obliteration. Emmet expresses this well when he says "the surface of the canal is essentially a cicatricial one, and will consequently contract to a greater or less extent." To diminish the liability to contraction, he recommends that the tissues be torn with the finger-nail or broken

up with the scissors rather than divided with the knife; the raw surface is made to heal upon a glass plug.

We shall describe shortly the operations for (1) imperforate hymen, (2) atresia of the vagina, (3) atresia of the cervix.

1. *Imperforate Hymen.*—This operation, though apparently simple, should never be performed in the consulting room, but always at the patient's house or in hospital. The time chosen should be between two menstrual periods which are indicated by menstrual molimina. The hymen is punctured with a small trocar which has been rendered thoroughly clean and aseptic beforehand. The fluid is allowed to escape slowly. After it has ceased to flow, the opening in the hymen is enlarged with a knife. This incision is made in the form of a cross, or the membrane is pinched up with forceps and an elliptical portion cut out. A. R. Simpson recommends that the opening in the hymen be made with the cautery, which prevents septic absorption by the wound. We can dispense with the trocar if we take care to make at first only a small opening, which can afterwards be enlarged. A stream of warm carbolised water is now made to flow gently into the cavity; the opening should be large enough to permit the fluid to flow outwards at the same time, so that the sac may be washed out without being subjected to any pressure. A plug of lint soaked in carbolised oil is placed in the hymeneal orifice, and a larger pad over the vulva. The patient keeps her bed for a few days after the operation. If there be a rise of temperature or other indications of septic inflammation, the vagina should be again washed out.

2. *Atresia of the Vagina.*—The following is the method adopted by A. R. Simpson. The patient is placed in the lithotomy posture, and the labia are retracted by the fingers of the assistants who hold the thighs. The sound is passed into the previously emptied bladder; it is then held by an assistant in such a way that the urethra and bladder are drawn well upwards towards the pubis. The index finger (with, if necessary, the second) of the left hand is introduced into the rectum and the thickness of tissue between the finger and the sound, as well as the position of the distended sac above, carefully ascertained; the finger is kept in the rectum during the operation, both to hook that structure backwards so as to prevent its being cut into and to guide in tearing up the septum. Should the operator wish to have both his hands free to use instruments, an assistant can pass the finger into the rectum. The operator now makes with the knife a transverse incision over the hymen, or through the skin be-

tween the anus and the urethra. When the sac is reached, it is punctured and washed out with the same precautions as in the operation for imperforate hymen; it is then carefully and gently packed with strips of lint soaked in carbolised oil. These are taken out on the following day, but a tightly fitting plug is left in the newly formed portion of the vagina to prevent its contraction; after three or four days, a perforated glass plug (Fig. 304) is passed in to keep the new canal dilated. The plugs are made of various thicknesses, and have a rim at the external end to prevent their being pushed in too far. The plug must not be so long as to press on the roof of the vagina, and should be of such a thickness that, while it can be easily slipped out and in by the wearer, it stretches the new canal; it is kept in position by tapes which are fastened to the rim and, before and behind, to an abdominal band. A pessary can be employed subsequently; some instrument may have to be worn constantly for a year or more, and, where there is continued tendency to contraction, for a short period daily during many years.

Fig. 304.

Perforated glass plug to be used after operation for atresia vaginæ. The left-hand figure shows the external end of the tube with the tapes attached.

This operation has been performed even when there has been no accumulation of menstrual blood. The indications for operating are thus given by Thomas: "It should be resorted to (*a*) if menstrual blood be imprisoned; (*b*) if a uterus can be distinctly discovered and the patient be suffering from absence of menstruation; (*c*) if the necessity for sexual intercourse be imperative." Cases have been recorded in which the formation of a vaginal canal has led to the establishment of menstruation when it was formerly absent, to the development of the uterus and ovaries where these were rudimentary, or to an improvement in the general health of the patient although there was no indication of further development in the rudimentary uterus and ovaries.

More difficulty is experienced in operating where there is no accumulation of menstrual blood and the vagina is entirely absent or represented

by a fibrous cord. In such a case, there is not the same necessity for surgical interference unless it be to satisfy the claims of married life. If the uterus and ovaries be well developed and the patient be anxious to have her condition remedied, the operation is justifiable. Here we have not the distended sac as a guide to the point on which we are to cut down. The cervix, of which the position should be ascertained by a combined recto-abdominal examination, should be fixed as far as possible by an assistant's making firm pressure from above upon the uterus; there is no danger in such pressure if there be no accumulation of menstrual blood. The mode of procedure is the same as that just described.

3. *Atresia of the Cervix.*—Usually the obstruction is so slight that the forcible passage of the sound overcomes it. Should the obstruction resist all efforts to pass the sound we require to use the knife to open the canal. If the uterus be much distended with menstrual blood, it is safer to empty it first with the aspirator-needle passed through one of the for-

Fig. 305.

Breisky's forceps, tube, and nozzle for operating in atresia of the cervix (Breisky).

nices; the emptying should be effected slowly and, if the distention be considerable, at more than one sitting; rapid emptying is apt to set up uterine contractions which may produce rupture of a dilated Fallopian tube. To open up the cervical canal, the following method is adopted by Thomas. The cervix is steadied with a tenaculum. A long exploring needle is passed along the line of the cervical canal into the uterine cavity, the sense of resistance overcome and the escape of a drop of blood indicating that the needle has reached it. A delicate tenotome is placed in the gutter of the needle and pushed upwards for the required distance. This process is repeated so as to divide the cervix on four sides in a radiate manner. The cavity of the uterus is washed out with a syringe, and a glass tube passed into the cervical canal to keep it open.

Breisky has devised the instruments represented in Fig. 305, to facilitate the washing out of the uterine sac in cases of extensive atresia of the

vaginal canal and cervix with hæmatometra. The septum which separates the urethra and bladder from the rectum is split up so as to form a new vagina, and the cervix is thus exposed. To form the new cervical canal, Breisky employs a knife-edged trocar running in a canula. The canula is pressed firmly against the cervix, and the knife is run out piercing through the cervix into the dilated uterus above; the canula is then run on the knife into the cavity, and the knife withdrawn. The contents of the sac escape through the canula. The forceps represented at Fig. 305 are now passed in with one blade on each side of the canula. They are forcibly opened so as to distend the new canal still further, and they serve to keep it patulous while the canula is withdrawn and the tube represented at Fig. 305 inserted in its place. This tube has two channels; into one of

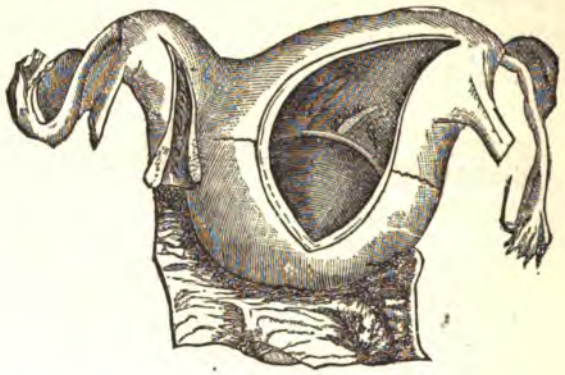

Fig. 306.

Septate uterus; the right half is pervious, the left half has been distended with retained menstrual blood (Schroeder).

these a nozzle (Fig. 305) fits and is employed to pass the stream of water into the sac, while the outflow takes place by the other.

4. *Atresia of One Half of a Septate Uterus and Vagina.*—This form of atresia has certain characteristics which distinguish it from the other forms described above.

The chief peculiarity is that it presents the phenomena of free menstruation + those of retained menstruation.

The pathological condition is apparent from Fig. 306. Spontaneous rupture of the septum with escape of the retained fluid (in this case through the patulous uterus or vagina) occurs more frequently in this than in other forms of atresia; rupture of the Fallopian tube, with its fatal consequences, is also a more frequent occurrence. The spontane-

ous rupture of the septum does not usually occur at its lowest point; hence there is liability to accumulation of purulent matter in the pouch below the point of perforation, which is a source of septicæmia.

The symptoms are the same as in the other forms of atresia, but they are marked by the presence of a menstrual flow. This visible menstruation is often irregular, and profuse leucorrhœa (from the patulous cavity) is frequently present.

The physicial examination shows a fluctuating tumour lying beside the uterus and alongside of the patulous vaginal canal. Sometimes it winds in a spiral manner round the latter.

The diagnosis is not difficult if the blind sac extend to the ostium vagina and is felt running alongside of the vaginal canal or winding round it. If, however, it be limited to the side of the uterus or only extend partially on to the vagina, it may easily be mistaken for other para-uterine tumours—most frequently for hæmatocele (Schroeder). To clear up the diagnosis and also as a step towards treatment, we puncture the sac with the aspiratory-needle. The character of the discharged blood will indicate the diagnosis.

The treatment consists in slowly but thoroughly evacuating the sac, washing it out and establishing a permanent opening from it.

A *septate vagina* is sometimes found with a septate uterus (*v.* Fig. 142, Vol. I.), both halves being pervious so that there are no symptoms. Traces of a septate condition may persist as bands.

CHAPTER XLIV.

VAGINITIS; VAGINISMUS.

LITERATURE OF VAGINITIS.

Barnes—Op. cit., p. 865. *Hennig*—Der Katarrh der weiblichen Geschlectsorgane. *Hildebrandt*—Monat. f. Geb., Bd. XXXII., S. 128. *Macdonald, Angus*—Edin. Med. Jour., June, 1873. *Noeggerath*—Latent Gonorrhœa in the Female Sex: Am. Gyn. Trans., Vol. I., p. 268. *Ruge*—Zeitschrift f. Geb. u. Gyn., Bd. II., S. 29, and Bd. IV., S. 133. *Schroeder*—Op. cit., S. 460. *Thomas*—Op. cit., p. 211. *Winckel*—Arch. f. Gyn., Bd. II., S. 406.

VAGINITIS.

SYNONYMS.—Colpitis (Gr. κόλπος, *a fold*); Elythritis (Gr. ἔλυτρον, a sheath).

NATURE AND VARIETIES.

Vaginitis is an inflammation of the mucous membrane of the vagina. The structure of this mucous membrane has been already described (*v.* Vol. I., p. 27). From its consisting of connective-tissue papillæ covered with several layers of squamous epithelium, it resembles the structure of the skin rather than that of a mucous membrane; it is a disputed point whether true mucous glands with ducts are present. Consequently, the inflammatory changes are more allied to those of the skin than to those of a mucous membrane (Schroeder).

According to etiology, vaginitis is either *simple* or *gonorrhœal*. Apart from the history, we cannot for certain distinguish between these (*v.* Etiology).

The clinical distinction between *acute* and *chronic* vaginitis is merely a question of degree.

Diphtheritic vaginitis will be referred to by itself.

Senile vaginitis is one of the physiological retrogressive processes occurring after the menopause.

PATHOLOGY.

Vaginitis occurs most frequently in the form of slight elevations of the mucous membrane, which produce a granular surface. These granulations, according to Ruge, consist of groups of papillæ infiltrated with small cells; these swell up and push before them the stratified squamous

Fig. 307.

Granular vaginitis—acute form (Schroeder).

epithelium, the superficial layers of which are shed (Fig. 307). When the condition has existed some time, the surface becomes more equal through the thinning of the epithelial covering (Fig. 308).

Associated with vaginitis in pregnancy, there is sometimes an emphysematous condition of the vaginal mucous membrane. Winckel has described cysts containing gas and fluid; according to Ruge, the air is present in spaces among the cellular tissue (Fig. 309).

Fig. 308.

Granular vaginitis—chronic form (Schroeder).

The cicatricial contraction of the vagina observed after the menopause is due to a senile vaginitis. The epithelium is shed in patches, and the raw surfaces thus produced adhere together (Hildebrandt). This process is similar to that which produces occlusion of the cervical canal after the menopause.

Diphtheritic vaginitis occurs either as localised patches or as an affection of the whole vagina. In the latter case, the mucous membrane may

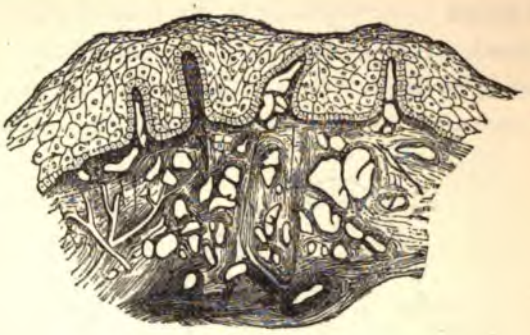

Fig. 309.

Colpitis, emphysematosa (Schroeder).

be so swollen that the finger scarcely reaches the cervix, which also is found to be thickened and covered with the diphtheritic membrane.

ETIOLOGY.

The following are the most important causes :

Gonorrhœal infection ;

Irritating discharges from the uterus ;

Injurious vaginal injections, badly-fitting pessaries or other causes which injure the vaginal mucous membrane ;

Exanthemata.

Gonorrhœal infection produces the most intractable form of vaginitis, which may extend over months or years. We have not space here to discuss the question whether there is a specific poison in the gonorrhœal discharge.

Irritating discharges from the uterus, as in endometritis, produce a secondary vaginitis which can only be treated by curing the uterine affection. In carcinoma and vesico-vaginal fistulæ, vaginitis arises secondarily.

Among the causes which irritate or injure the vaginal mucous membrane, we mention injections of too hot or too cold water and of substances to produce abortion, badly-fitting pessaries, tampons or pieces of sponge which have been allowed to lie some days in the vagina. Vaginitis may also develope on a patient's entering married life, simply from awkwardness in sexual intercourse ; on being consulted about such cases, we must

remember that *a simple vaginitis may produce all the symptoms of one due to gonorrhœa.*

Diphtheritic inflammation occurs usually in the puerperal condition and that through bad hygiene. It has been observed in *typhus, small-pox, and cholera,* and also in some cases of gonorrhœa. Localised diphtheritic patches are seen in fistulæ, in carcinoma, and round, badly fitting pessaries.

SYMPTOMS.

These are the following :

A burning heat in the vagina ;

Pain in the floor of the pelvis ;

Frequent desire for micturition, with a scalding sensation while water is passing ;

Free muco-purulent leucorrhœa.

These symptoms are present both in simple vaginitis and that due to gonorrhœal discharge. In the latter case, the urinary symptoms are more pronounced ; there is a distinct period from which all the symptoms commenced, their duration is longer, and they resist treatment ; they are often complicated with those of endometritis, cystitis, or pelvic peritonitis.

DIAGNOSIS.

On vaginal examination, the finger recognises the discharge which escapes on separating the labia and, in many cases, the rough condition of the mucous membrane.

The speculum shows that the mucous membrane is inflamed and covered with muco-purulent discharge ; the redness is usually in the form of patches but may be diffuse.

The appearance of the cervix must be noted to ascertain that the leucorrhœal discharge does not come from it ; the differentiation of discharge from the uterus and that from the vagina, is made as described in Vol. I., page 295.

The *differential diagnosis* between *simple and gonorrhœal* vaginitis is often very difficult. The history of a distinct source of infection is the only certain guide, and the ascertaining of this is a very delicate question. Apart from this, the following conditions point to a gonorrhœal origin : sudden development of vaginitis with urinary symptoms, in a patient who has had previously no marked leucorrhœal discharge ; absence of any

other cause to explain these ; protracted duration of symptoms and resistance to treatment. However convinced the practitioner may be in his own mind that the vaginitis is of a specific nature, the social unhappiness caused by his expressing a decided opinion should deter him from giving it in cases where a cause is not admitted.

Pelvic abscesses discharging through the roof of the vagina have been mistaken for vaginitis (Thomas). Such a mistake will not arise when the bimanual and other methods of examination are employed. We must not be satisfied with finding vaginitis ; the whole routine examination of the pelvic organs must be made after the pressing symptoms have been relieved.

TREATMENT.

In *acute cases*, rest in bed is necessary. Warm water injections are given three or four times daily ; the douche is much more convenient than the syringe ; it leaves the hands free, requires less exposure of the patient, and keeps up a steady stream (*v.* Vol. I., p. 146). The stream should run for a quarter of an hour. A piece of gutta-percha tubing, weighted at one end and with a clip at the other, makes a handy douche ; the weighted end is placed in a ewer of water above the level of the bed, the tube is coiled up in the water so as to be filled, the clamp is put on at the other end and the tube withdrawn ; the siphon action is started by the column of water in the tube and continues till the ewer is empty. The bowels are freely moved and then a morphia suppository is given ; in severe cases, the patient may be kept under opium. Complete rest from sexual activity is absolutely necessary.

In chronic cases or after the acute stage has passed off, astringents are added to the injections. The vaginal walls having been first thoroughly dried, a solution of nitrate of silver (℥ j. to ℥ j. of water) is applied and a tampon of carbolised cotton soaked in glycerine introduced to keep the walls apart (Thomas).

Applications to the vagina are usually made by means of medicated pessaries. The following are those most frequently used :[1]

	Grains.
Atropine, sedative, ...	1–20
Belladonna, sedative, ...	2 Alo. Ext.
Morphia, sedative, ...	½

[1] As made up and supplied by Messrs. Duncan, Flockhart & Co.

	Grains.
Bismuth, Oxide, cicatrizing and emollient, . .	15
Borax, cicatrizing and emollient, ...	15
Zinc, Oxide, cicatrizing and emollient, . . .	15
Tannin, astringent, ...	10
Alum, astringent, ...	15
Acetate of Lead and Opium, astringent, . .	2 gr. Opium.
Gallic Acid, astringent, ...	10
Persulphate of Iron, hæmostatic, ...	5
Sulphate of Zinc (dried), caustic, ...	10
Iodide of Lead, alterative and resolvent, . .	5
Mercurial, alterative and resolvent, . . .	30 (*Ung. Hydrarg.*)
Carbolic Acid, deodorant, ...	5

Lawton's absorbent cotton[1] is the best material for vaginal tampons which are to be soaked in glycerine or other medicaments.

VAGINISMUS.

LITERATURE.—*Duncan*, *Mathews*—Clinical Lectures, p. 121. *Hildebrandt*—Archiv. f. Gyn., Bd. III., S. 221. *Scanzoni*—Lehrbuch der Krankheiten der weiblichen Geschlectsorgane : Wien, 1875, S. 704. *Simpson*, *Sir J. Y.*—Edin. Med. Journ., Dec., 1861; and op. cit., p. 284. *Sims*—Cases of Vaginismus : Americ. Med. Times, 1862, Nos. 22 to 25. *Thomas*—Op. cit., p. 203. *Tilt*—The Lancet, Aug., 1874.

By vaginismus, we understand a reflex contraction of the muscular fibres surrounding the vaginal orifice—just as laryngismus is applied to the same condition in the larynx.

ETIOLOGY.

It is found in some patients of a nervous and sensitive temperament without there being any local source of irritation, but this is exceptional.

Usually one of the following conditions is present :—

An irritable spot in the fossa navicularis ;

An inflamed hymen which has not been ruptured, or irritable carunculæ myrtiformes ;

Fissures in the fourchette or round the vaginal orifice ;

Small ulcers within the hymen ;

Fissure of the anus ;

Urethral caruncle.

[1] Sold in packets (2 oz.–½ lb.).

SYMPTOMS AND DIAGNOSIS.

Dyspareunia and sterility are the leading symptoms.

By *dyspareunia* (a term introduced by Barnes), we understand painful or difficult sexual intercourse; hence the conditions which produce vaginismus arise on the patient's entering married life. The suffering may be so great that medical advice is at once sought; more frequently, a sense of delicacy prevents this till the condition has existed some time.

In some cases there is a careworn and anxious expression of countenance, in others a hysterical manner. As the ordinary vaginal examination is painful—the patient involuntarily drawing away as soon as the painful spot is touched—it is best to make inspection of the genitals first. Here we may see any of the conditions mentioned under pathology. Sometimes no local cause is evident; but on carrying the finger into the vagina the reflex contraction of the muscle is felt.

Hildebrandt has shown that this muscular contraction is sometimes noticed in the upper part of the vagina, and is then due to spasm of the levator ani.

The possibility that the dyspareunia may be due to some local pathological condition at the roof of the vagina (prolapsed ovary or cellulitis) and not at the ostium, should be kept in mind.

The *prognosis* as to cure is good. From the distressing nature of the symptoms and the relief obtained by the means to be described, they prove very satisfactory cases for treatment.

TREATMENT.

First remove any cause of local irritation, as urethral caruncle or irritable carunculæ myrtiformes; in some cases it is necessary to clip away carefully the whole hymen. Divide the base of irritable fissures with the knife, or touch them with the actual cautery. Iodoform in powder or made into an ointment is the best local application to allay irritation or favour healing. Its penetrating and disagreeable odour makes many patients object to it. This is diminished by keeping Tonquin beans in the powder, and by adding oil of eucalyptus to the ointment or pessary.

℞. Iodoform..... gr. x.
Olei eucalypti..... ♏ j.
Fiat pessarium..... Mitte tales xij.
Sig.—As directed.

After the cause has been removed, the ostium vaginæ must be dilated. This is best effected by making the patient wear a vaginal dilator night and morning, for an hour at a time; it may be made of wood or of glass, and is of a conical form. The pain caused by the introduction passes off after a time. Dilators of gradually increasing size should be used.

If the dilator cannot be worn, we must have recourse to Sims' operation. In some cases, when the vaginismus is evidently due to the narrowness of the ostium and specially when a reflex contraction of the muscle is noted, this operation is done without previous use of the dilators.

Sims' Operation for Vaginismus.—We have already seen (Vol. I., p. 8) that the bulbo-cavernosi muscles embrace the ostium vaginæ and form a kind of sphincter for it; their position is seen in Fig. 7, Vol. I. To divide the superficial fibres of this muscle is the aim of the operation.

The patient being under chloroform, two fingers of the left hand are passed into the vagina so as to stretch the ostium. With an ordinary scalpel, an incision is made on each side of the fourchette; the incision is about 2 inches long, and extends from ½ an inch above the ostium to the raphe of the perineum. The ostium is now thoroughly and firmly plugged with lint, which is kept in place with a T-bandage; thorough plugging is essential, as there is often smart hemorrhage from the incisions. Next day the lint is removed and a glass dilator introduced, which must be worn for one or two hours night and morning during a period of several weeks.

Instead of dividing the sphincter with the knife, it may be forcibly stretched with the fingers till the muscular fibre is ruptured. This is done by passing the thumbs (Tilt) or several fingers (Hegar) of each hand into the ostium, and then forcibly separating them till we feel the muscular fibre give under the traction. The advantage of this method is that it is bloodless and there is no granulating wound left to heal.

With these local measures, we should always combine constitutional treatment. Exercise, fresh air and change of scene are beneficial. It is self-evident that complete rest to the sexual system must be strictly enjoined during any course of local treatment; this should be maintained for some time afterwards, which may be secured by recommending a few weeks change to a Hydropathic. Tonics (such as quinine, iron, and ar-

are given as the case requires.

TUMOURS OF THE VAGINA.

Under tumours of the vagina we briefly describe the following:

Cysts,
Fibroid tumours,
Carcinoma,
Sarcoma.

Tubercular and syphilitic ulceration do not call for special description.

CYSTS OF THE VAGINA.

LITERATURE.—*Breisky*—Die Krankheiten der Vagina: Stuttgart, 1879, S. 130. *De Sinéty*—Op. cit., p. 164. *Mundé*—American Jour. of Obst., Vol. X., p. 673. *Von Preuschen*—Virchow's Archiv., Bd. LXX., S. 3.

Pathology.—They are situated most frequently in the anterior vaginal wall, and usually in the lower third but within the ostium. They are generally single, rarely have two or more been found together. They are

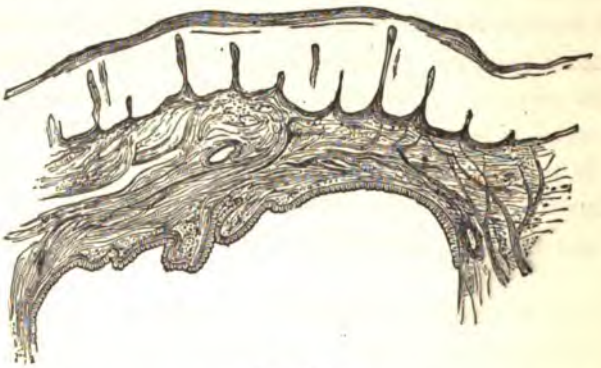

Fig. 310.

Section of vaginal cyst (Schroeder). The cyst wall which is lined with a single layer of epithelium is separated by some tissue from the mucous membrane which is covered with many layers of squamous epithelium not detailed in the section.

lined with a single layer of cylindrical epithelium which contrasts with the many layers of squamous epithelium of the vaginal mucous membrane from which they lie separate (Fig. 310). We have seen them of the size of a hen's egg. Their contents vary from a clear thin fluid to a gelatinous chocolate-coloured inspissated mucus.

Etiology.—As there are no mucous glands present in the vaginal mucous membrane, the mode of origin of these cysts is disputed. In some cases they can be traced to crypt-like depressions of the mucous

membrane which become shut off (Von Preuschen). It has been suggested by Veit that they are due to persistence of the canals of Gärtner, an exceptional occurrence.

Symptoms.—These are often nil; and such cysts readily escape observation, so that they may be more frequent than is supposed. When of large size, they produce bearing down pain with leucorrhœa and in some cases dyspareunia.

Diagnosis.—Small cysts readily escape detection. When large, their smooth elastic surface and fluctuation make them easily recognised. They must not be confounded with cysts due to obstructed Bartholinian glands, which are situated on the labia minora or just at the ostium. Careful examination will easily distinguish them from a pouching of the bladder or rectum.

Treatment.—This consists in laying the cyst open and destroying its lining wall, which is best done by the cautery. Schroeder cuts out a portion of the cyst wall, and stitches the margins of the rest to the adjoining vaginal mucous membrane so that the cyst is taken up into the vagina; this does away with the granulating surface and subsequent cicatrisation which accompany cauterisation. If the patient is past the menopause and the cyst gives no trouble, there is no occasion to interfere.

FIBROID TUMOURS OF THE VAGINA.

LITERATURE.—*Breisky*—Die Krankheiten der Vagina, S. 139. *A. R. Simpson*—Fibroma Vaginæ, op. cit., p. 201.

Pathology.—Fibroid tumours rarely originate in the vagina; Breisky has collected only 37 cases out of their literature. Like fibroid tumours of the uterus, they consist chiefly of fibrous tissue with some unstriped muscular fibre; they are usually situated in the anterior wall, in 17 out of 27 cases (A. R. Simpson); they are pediculated (forming so-called fibrous polypi) or sessile.

Symptoms.—These are produced only when the tumour is large. In the case described by A. R. Simpson, in which the tumour was the size of two fists, it interfered with micturition and the escape of the uterine discharges.

Diagnosis.—This is easy, except in the case of large tumours when the pedicle is difficult to reach. The relation of the bladder should always be carefully ascertained.

Treatment consists in division of the capsule and enucleation of the

tumour when it is sessile, or ligature and division of the pedicle when it is pediculated.

CARCINOMA OF THE VAGINA.

LITERATURE.—*Breisky*—Op. cit., S. 151. *Bruckner*—Der primäre Scheidenkrebs und seine Behandlung, Zeitschrift für Geburtshülfe und Gynäk., B. VI., Hft. 1, S. 110. *Goodell*—Boston Gyn. Jour., Vol. VI., p. 383. *Küstner*—Archiv. f. Gynäk., Bd. IX., S. 279. *Parry*—Amer. Jour. of Obstet., Vol. V., p. 163; and Philad. Med. Jour., Feb. 1, 1873. *Simpson, A. R.*—Op. cit., p. 205.

Pathology.—Primary carcinoma occurs very rarely in the vagina—in 14 out of 8,287 cases (Beigel); in the paper cited above, Küstner has collected but 28 cases out of the whole literature. This is the more surprising when we remember how very frequently it affects the cervix. It occurs in two forms, either as a localised broad-based papillary swelling seated most frequently in the posterior wall or as a diffuse infiltration which often constricts the canal in a ring-like manner. The inguinal glands are generally enlarged by carcinomatous infiltration.

Symptoms and Diagnosis.—As in carcinoma of the cervix, there is hemorrhage and fœtid discharge; the pain is slight in the early stage. The diagnosis that there is *primary* carcinoma of the vagina is often doubtful, because it is difficult to ascertain the condition of the cervix and uterus; in the specimen represented at Fig. 275, it was supposed to be primary until the post-mortem showed that it was secondary to carcinoma of the cervix. The examination per rectum is useful in these cases.

Treatment.—This consists in the removal of as much as possible of the diseased tissue with the cautery, spoon, or knife. Bruckner recommends that, where possible, the wound produced by extirpation of the carcinomatous mass be closed by deeply placed sutures.

SARCOMA VAGINÆ.

LITERATURE.—*Breisky*—Op. cit., S. 150. *Man*—Amer. Jour. of Obst., Vol. VIII., p. 541. *Meadows*—Lond. Obst. Trans., Vol. X., p. 141. *Simpson A. R.*—Op. cit., p. 204. *Smith*—Amer. Jour. of Obst., Vol. III., p. 671. *Spiegelberg*—Arch. f. Gyn., Bd. IV., S. 348.

Sarcoma of the vagina has only recently been described, and is still rarer than sarcoma uteri. As in the uterus, it is either diffuse or in circumscribed nodules. The symptoms are the same as in sarcoma uteri; and the treatment consists in removal (more easily effected in the circumscribed form), which in a case reported by Spiegelberg effected a permanent cure.

SECTION VII.

AFFECTIONS OF THE VULVA AND PELVIC FLOOR.

CHAPTER XLV. The Vulva: Malformations; Inflammation; Tumours.

" XLVI. Rupture of the Perineum and its Operative Treatment.

" XLVII. Displacements of the Pelvic Floor: Prolapsus Uteri; Enterocele.

CHAPTER XLV.

THE VULVA: MALFORMATIONS; INFLAMMATION; TUMOURS.

LITERATURE.

MALFORMATIONS. *Hildebrandt*—Die Krankheiten der äusseren weiblichen Genitalien: Stuttgart, 1877, S. 2. *Meyer*—Virchow's Archiv., XI., p. 420. *Schroeder*—Op. cit., S. 497. *Simpson, Sir J. Y.*—Hermaphroditism: Collected Works, Vol. II., p. 407. *Tait, Lawson*—Am. Gyn. Trans., Vol. I., p. 318.

INFLAMMATION. *Hildebrandt*—Op. cit., S. 17 and 64. *Simpson, Sir J. Y.*—Diseases of Women, p. 286. *Thomas*—Op. cit., p. 122.

TUMOURS. *Hildebrandt*—Op. cit., Chap. VII., where the student will find the literature of the various forms of tumour fully given.

MALFORMATIONS.

THESE are easily understood when we remember the normal development of the external organs of generation. 1. At the sixth week of fœtal life, the *genital eminence* appears externally; at this period the rectum,

Fig. 311.

R, rectum, continuous with *All*, allantois (bladder), and *M*, duct of Müller (vagina). *x*, depression of skin below genital prominence which grows inwards and forms vulva (Schroeder).

Fig. 312.

The depression has extended inwards, and, becoming continuous with the rectum and allantois, formed the cloaca, *cl* (Schroeder).

Fig. 313.

The cloaca is becoming divided into uro-genital sinus, *Su*, and anus by the downward growth of the perineal septum. The ducts of Müller have united into the vagina, *V* (Schroeder).

allantois, and ducts of Müller communicate with one another, but not with the exterior (Fig. 311). 2. At the tenth week, a depression of the skin (known as the *genital cleft*) occurs; this extends inwards till it meets the conjoined allantois and rectum, and thus the cloaca is formed (Fig.

312). 3. The tissue between the rectum and the allantois grows downwards, and divides the cloaca into an anterior part (the *uro-genital sinus*, into which the ducts of Müller open) and a posterior part (the anus); thus the *perineum* is formed (Figs. 313 and 314). 4. The uro-genital sinus contracts in its upper portion to form the urethra, while the lower part persists as the vestibule (Fig. 315); the ducts of Müller coalesce to form the vagina (*v.* Vol. I., p. 74).

The parts round the vulva develop, therefore, as follows: the *clitoris* from the genital eminence, the *labia minora* from the margins of the genital cleft, the *vestibule* from the uro-genital sinus.

Fig. 314.

The perineum is completely formed (Schroeder).

Fig. 315.

The upper part of the uro-genital sinus has contracted into the urethra; the lower portion persists as the vestibule, *Su* (Schroeder).

The following malformations have been described. 1. *Complete atresia of the vulva* through the non-formation of the depression of the skin (Fig. 311); the allantois and rectum either communicate as in Fig. 311 or have become separated. This condition has only been found in fœtal monstrosities. 2. *Persistence of a cloaca* so that the rectum, vagina, and urethra have a common orifice (Fig. 312); such cases are sometimes spoken of as atresia of the anus, but are really due to non-formation of the recto-vaginal septum. 3. *Persistence of the uro-genital sinus* into which the bladder opens directly as the urethra has not formed (Fig. 314); in such cases the vulvar orifice is contracted and opens into a long, narrow vestibule, which, at its farther end, communicates with the bladder and vagina. This condition is sometimes described as hypospadias.

HERMAPHRODITISM.

For a detailed description of this condition, with illustrative cases, the student should consult Sir J. Y. Simpson's exhaustive article on Hermaphroditism (Collected Works, Vol. II., p. 407).

Of hermaphroditism (Ἑρμῆς and Ἀφροδίτη) there are two varieties, true and spurious.

By *true hermaphroditism*, we understand that from the Wolffian bodies both ovary and testicles have developed, so that both forms of gland coexist in the same individual. This is an extremely rare occurrence; when it has occurred, there is a tendency towards the better development of one form of organ (determining the sex) while the other is rudimentary. According to Hildebrandt (loc. cit., S. 6), only two authentic cases of bilateral hermaphroditism (ovary and testicle present on each side) have been recorded; of unilateral hermaphroditism (ovary and testicle present on one side, the other side having only one form of gland), a case has been recorded by Bannon; lateral hermaphroditism (ovary on one side and tes-

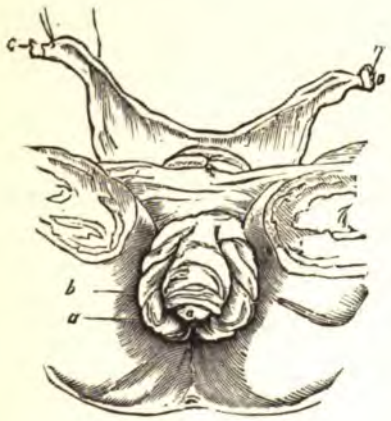

Fig. 316.

Spurious Hermaphroditism (Sir J. Y. Simpson). Pelvis of a female infant in which the external organs simulated those of a male. *c*, uterus and appendages; *b*, hypertrophied clitoris with a sulcus, *a*, at its extremity, which ended blindly and did not communicate with the urethra.

ticle on the other) has been more frequently met with, and cases, confirmed by microscopic examination, have been recorded by Berthold, Barkow, and Meyer.

By *false or pseudo-hermaphroditism* is understood a malformation of the external organs so that they simulate those of the opposite sex. This occurs in two forms. 1. The external organs in the female may simulate those of the male. This is due to a hypertrophy of the clitoris and its prepuce, with approximation of the labia majora (simulating a scrotum) and contraction or occlusion of the ostium vaginæ; in very rare cases is the clitoris perforated by the urethral canal. This condition is seen at Fig. 316, which represents the pelvis and external organs of an in-

fant christened as a boy; a post-mortem dissection showed that the sex was female.[1]

2. The external organs in the male may simulate those of the female; the non-closure of the lower surface of the urethra and perineum, which constitutes hypospadias, produces an appearance resembling the external organs in the female. Numerous cases are on record in which the sex of males has been mistaken, even by medical experts, and the persons have entered married life as belonging to the female sex. The penis may be

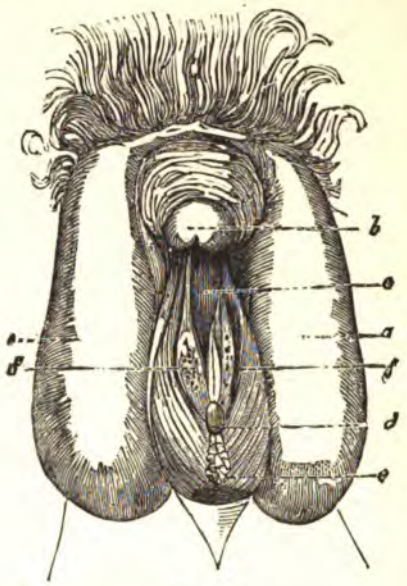

Fig. 317.

Spurious Hermaphroditism (Sir J. Y. Simpson). Case of hypospadias in the male, making the external organs simulate those of the female. *a*, *a*, lobes of scrotum; *b*, imperforate penis, 1½ inch long; *e*, perineal fissures 1½ inch deep, lined with mucous membrane, at bottom of which the urethral orifice, *d*, is seen; *c*, the split urethra with openings, *f*, of glands beside it—supposed to be orifices of prostatic ducts, of Cowper's glands, and of seminal canals.

small and imperforate, the urethra opening at its base; the perineal fissure, lined by mucous membrane, may closely resemble the vagina; and the halves of the scrotum may appear like labia. This condition is seen at Fig. 317: the case is reported by Otto;[2] the person lived in a state of wedlock with three husbands before the true sex was ascertained by medical examination.

Cases of epispadias, in which the urethra (through defect of the upper

[1] Ramsbotham: Med. Gazette, XIII., p. 184.

[2] Sir J. Y. Simpson: Loc. cit., p. 427.

portion of the penis) is exposed along with a portion of the bladder, would only on hasty examination be mistaken for the external female organs. The exposed vesical mucous membrane with its skin margins resembles the vagina with the labia, but it is situated above the pubis ; further, below the penis we find the normal scrotum and testicles.

Diagnosis.—In examining a case, proceed as follows: Palpate the supposed labia carefully to ascertain whether testicles are present in them ; the possibility of hernia of the ovaries into the labia and of non-descent of the testicle into the scrotum, must be kept in view. 2. Examine per rectum for traces of uterus or ovaries. 3. After puberty watch for the menstrual molimina or hemorrhage in the female, and for development of sexual powers in the male. 4. Note secondary sexual characters: development of breasts, appearance of face, tone of voice, and inclination toward one or other sex.

Hermaphroditism, like malformation in general, lies beyond treatment.

INFLAMMATION OF THE VULVA (VULVITIS).

Pathology.—In the acute stage, the mucous membrane round the ostium vaginæ and urethra is red, swollen, and painful. Sometimes the mucous glands are obstructed, and a form of acne develops ; the glands of Bartholini may inflame and suppurate, producing an abscess about the size of a pigeon's egg ; the sebaceous glands at the roots of the hair on the labia majora are sometimes specially affected, producing the "Folliculite vulvaire" of Huguier. In the chronic stage, there is abundant secretion of creamy purulent matter ; when due to gonorrhœa, condylomata form round the vaginal orifice.

Etiology.—It is often secondary to vaginitis, and accompanies urinary fistula and carcinoma. Want of cleanliness and protracted exercise, specially in hot weather, produce it, and that most readily in patients with much adipose tissue. It is sometimes occasioned by awkward coitus and by masturbation. In children, it is not uncommon ; it is important to remember this, as the inflamed appearance of the vulva and the profuse discharge make the parents suspect that the child has been attacked and has contracted specific disease. It is caused by irritation of urine, want of cleanliness, and the strumous diathesis ; sometimes it takes an epidemic form in the children of a family or district (Sir J. Y. Simpson).

The Symptoms and Physical Signs will be apparent from what has been said under pathology.

Treatment.—Strict attention to cleanliness must be enjoined; frequent bathing with warm water and the application of hot linseed poultices will ease pain. In children, the pain in micturition is relieved by its being done while in a warm bath. Sedative lotions such as acetate of lead and opium may be required:

℞. Tinct. opii..... ℥ ss.
Plumbi acetat..... ʒ i.
Aquam ad..... ℥ vi.
M.

In chronic cases, frequent washing with 2 per cent. sol. of carbolic or with astringent lotion is necessary. In abscess of the glands, the pus is evacuated through the gland ducts on pressure, or by free incision.

PRURITUS VULVÆ.

Definition.—An irritable condition of the external genitals producing excessive itchiness.

Pathology.—The irritable region is at the upper convergent angle of the labia majora at the mons veneris; it may extend from that over the vestibule and the vaginal orifice, and sometimes over the mons veneris on to the abdomen. The pathological changes in the skin which produce this irritability are not known, because the cases are not seen in an early stage. By the time that the irritation has become so unbearable that advice is sought, the skin is inflamed and excoriated by continued scratching which masks its original condition.

Etiology.—Any irritating discharges from the vagina, as in carcinoma, and even simple leucorrhœa, as from senile vaginitis, may produce it. It occurs in diabetes—due to the irritation of the sugar in the urine (Friedreich)—and in affections of the kidney and bladder, just as similar conditions produce irritation of the penis in man. In children it accompanies vulvitis, and has been traced to the passing of the oxyuris vermicularis from the anus to the vulva. It is also caused by whatever produces congestion of the labia—hence its occurrence at the menstrual period and in early pregnancy—and by irritable skin affections, as herpes and eczema of the vulva (Hildebrandt).

Symptoms.—The irritation is not continuous but recurs periodically. In some cases it appears only after taking a long walk or after getting

warm in bed; sometimes it is most marked just before the menstrual period. The irritability is slight at first, but becomes aggravated by scratching. To obtain this temporary relief, the patient comes to avoid company, and this, along with the constant irritation, has led in some cases to nervous depression and melancholia; sometimes the practice of masturbation is learned at the same time, and the consequent nervous symptoms gravely complicate the case.

Diagnosis.—As the most hopeful cases for treatment are those in which a distinct removable cause is found, a thorough examination is necessary: (1.) Carefully examine the external genitals for irritating skin eruptions or parasites; (2) expose the vagina and cervix thoroughly with the speculum to ascertain whether there is irritating leucorrhœa, the plugging of the vagina with cotton wadding to check discharge from the vagina or cervix will help us to exclude this (Thomas); (3) test the urine for albumen and sugar; (4) examine per rectum for any source of irritation there.

Treatment.—We must first remove the cause. When parasites are present, the mercurial or sulphur ointment is required; with vaginal or cervical catarrh, a tampon of wadding and glycerine (with acetate of lead ʒ ij. to ℥ ij.) in the vagina will check the irritating discharge. Attention to diet (which should consist largely of vegetables) and to the regular action of the bowels is necessary; when the gouty diathesis (with which pruritis is often associated in old patients) is present, lithia water is useful. It is a safe rule to forbid all stimulants. Frequent vaginal injections or sponging with warm water, followed by the application of boracic ointment or bismuth, will relieve mild cases; in more severe, the patient should have, several times a day, a warm sitz-bath combined with the douche; after this, iodoform is dusted over the vestibule or, if the patient is recumbent, lint soaked in acetate of lead and opium lotion is laid between the separated labia. In some cases, chloroform and almond oil have given relief (Scanzoni).

℞. Chloroformi..... ʒ ij.
Ol. amygdal..... ℥ ij.
M. *Sig.*—Apply externally as directed.

Preparations of mercury give benefit in other cases.

℞. Hydrarg. perchlor..... ʒ ss.
Aquæ..... ℥ vj.
M. *Sig.*—Apply externally as directed.

Schroeder has seen very good results from the application of carbolic acid of varying strength—1 to 40 up to 1 to 10. Where milder measures have failed, solid nitrate of silver well rubbed into the irritated parts and followed by cold water dressing has given relief. To procure rest at night, morphia and chloral may be necessary; Hildebrandt has found tinct. cannabis indicæ (♏ x.–xx.) even more effective than these.

ERUPTIONS ON THE VULVA.

The skin round the vulvar orifice may be affected with any of the eruptions found on other parts of the body. Of these the most important are erysipelas, eczema, prurigo, herpes, acne. These eruptions have the same character as when they occur in other situations and their treatment is the same. Condylomata will be referred to under syphilis.

TUMOURS OF THE VULVA.

Under these we shall notice briefly—

Cysts of the Bartholinian glands,
Elephantiasis,
Neuromata,
Fibroma,
Lipoma,
Carcinoma.

This is also the most convenient place to refer to

Pudendal hernia,
Varix, hæmatoma and hemorrhage.

Cysts of the Bartholinian Glands.—The Bartholinian or vulvo-vaginal glands, which are the analogue of Cowper's glands in the male, are situated at each side of the ostium vaginæ (see Fig. 7, Vol. I.): their ducts (about 2 c.m. long and wide enough to admit a fine probe) run upwards to about the middle of the ostium vaginæ, where their mouths may be seen just in front of the hymen.

A cyst may form by dilatation of the *ducts* or of the *glands* themselves. When due to distention of the duct, it has at first an elongated oval form; when the gland itself is affected, there may be multiple cysts or a lobulated swelling. The contents are thick mucus which is clear or of a brownish tinge. Suppuration may occur and abscess form (*v.* Fig. 318).

The symptoms are due to the discomfort of the swelling, which is most

felt on walking. The diagnosis is easy, from the position of the swelling and its fluctuating character; when it has developed during the puerperium, we must differentiate it from hæmatoma (which after a time becomes firm from coagulation) and inflammation after injury.

The treatment consists in complete evacuation of the cyst and destruction of its walls. It is not sufficient to open it and allow the fluid to escape; we must cut out a portion of the wall and then plug the cyst with carbolised lint. By far the best instrument is the thermo-cautery: we first puncture the cyst with it; when the fluid has escaped, we pick up the outer cyst wall with forceps and lay it fairly open with the cautery; we then cauterise the inner wall also. A piece of carbolised lint is laid over the wound.

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Fig. 318.
Abscess of the Bartholinian gland (Huguier).

Elephantiasis.—This is a common condition in tropical countries, but is comparatively rare in Europe and America although a minor degree of it is occasionally met with.

The pathological changes consist in a dilatation of the lymphatic spaces and ducts, with secondary formation of connective tissue and thickening of the layers of the cutis vera; sometimes the papillæ are specially enlarged, producing swellings which resemble condylomata in form. The labia majora are most frequently affected, next in frequency the clitoris; more rarely are the labia minora hypertrophied (Mayer).

It develops, according to Mayer, most frequently at ages of from 20 to 30 years—that is in the period of sexual activity. It has been traced to direct injury, but the most fruitful cause of minor degrees of hypertrophy is syphilis.

The symptoms are due to the weight and discomfort of the tumour, which may reach to the knees.

The treatment of the larger growths is removal with the thermo-cautery.

Neuromata, or exquisitely sensitive red papules which resemble a urethral caruncle, have been described by Sir J. Y. Simpson (see the figure of urethral caruncle); their occurrence, except at the urethral orifice, is extremely rare.

Fibromata.—These spring from the labia majora, resemble in structure fibroid tumours of the uterus and, like them, are embedded in cellular tissue or hang down by a pedicle.

Lipomata may arise from the fatty tissue of the mons veneris or labia majora. Emmet[1] describes a case in which the tumour hung down to the patient's knees and was supported in a bag round the waist; Stiegele[2] removed one which weighed 10 lbs.

Carcinoma of the vulva is rare in comparison with its frequency in the uterus. The most frequent form is the cancroid (West). It begins, usually on the inner surface of the labia majora, as small round nodules which elevate the skin; they may remain for a long time unnoticed, as their growth is at first slow and painless (Hildebrandt). After ulceration they spread more rapidly, and extend forwards and backwards but rarely into the vagina (Mayer). The inguinal glands are early involved.

Complete removal before the glands are affected, is the only treatment. As the growth is accessible, there seems a prospect of cure; during the last few years cases are reported by Schroeder and others of extirpation without recurrence, but the time elapsed is too short to justify definite conclusions.

Pudendal Hernia.—This corresponds to scrotal hernia in the male. The round ligaments are the analogues of the spermatic cord, and after emerging from the inguinal canal pass into the substance of the labia majora which correspond to the scrotum; if the process of peritoneum surrounding the round ligaments—known as the canal of Nuck—does not become obliterated at birth, it forms a track for the hernia.

Though it be very rare the possibility of a hernia must be kept in mind on examining a tumour of the labia; the crackling feeling, the impulse communicated on coughing, and disapearance on taxis, indicate

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[1] Op. cit., p. 601.

[2] Zeits. f. Chir. u. Geb., Bd. IX., S. 243.

hernia. The serious consequences of cutting into such a hernia by mistake for an abscess, are self-evident.

Varix.—The plexus of veins which forms the erectile tissue of the bulbi vaginæ has been already referred to (*v.* Vol. I., p. 9 and Fig. 7). A varicose condition of the veins sometimes occurs in pregnancy and with pelvic tumours. In a case described by Holden,[1] they formed, when the patient was erect, a tumour of the size of a child's head. When these vessels rupture and the blood is effused into the cellular tissue, a hæmatoma is formed.

Hæmatoma.—This condition is also called "Thrombus" and "Hæmatocele" of the vulva; the former term should be limited to a coagulum within a vessel, and the latter to blood effusion into the peritoneal cavity.

It arises most frequently during labour, from injury produced by the child's head; the effusion may appear rapidly, as a tumour from the size of a walnut to an orange or larger, or may take place gradually. It has also been known to occur independent of labour or pregnancy, as the result of a blow or violent muscular effort.

The treatment consists in the application of ice to the vulva, and regular evacuation of the bladder and rectum without the patient's being allowed to strain. With this treatment, the mass may be absorbed. Should inflammation occur, poultices are applied and pus is evacuated with the knife; if this occurs in the puerperal condition, special care is required to keep the wound aseptic by repeated washing with carbolic solution and dressing with carbolised lint.

External hemorrhage from ruptured veins sometimes occurs. The rupture may be caused by muscular straining, or by a blow or wound of the vulva. The dilated state of the veins makes such an injury serious during pregnancy, and several cases of a fatal result from a blow or kick have been the subject of criminal prosecution (Sir J. Y. Simpson). In a case recorded by Hyde,[2] hemorrhage from a vein ruptured by a fall proved fatal in forty minutes. Those who suffer from varicose veins should be recumbent for some hours during each day; should a vein rupture, the patient must lie down at once and apply pressure to the bleeding point.

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[1] Immense Vulvar and Vaginal Varix: N. Y. Med. Record, July, 1868.

[2] Lond. Obst. Trans., Vol. XI.

CHAPTER XLVI.

RUPTURE OF THE PERINEUM AND ITS OPERATIVE TREATMENT.

LITERATURE.

Bantock, G.—On the Treatment of Rupture of the Female Perineum, Immediate and Remote: Lond., 1878. *Duncan, Mathews*—Papers on the Female Perineum: Churchill, London, 1879. *Goodell*—Lessons in Gynecology: Phila., 1880. *Hart, D. B.*—Op. cit. *Hildebrandt*—Die Krankheiten der äusseren weiblichen Genitalien: Stuttgart, 1877. *Schroeder*—Op. cit., S. 512. *Simpson, Sir J. Y.*—Diseases of Women, p. 644. *Thomas*—Op. cit., p. 165. See *Duncan* and *Hildebrandt* for literature.

Nomenclature.—It will be most convenient to retain the nomenclature already used in the section on anatomy. The pelvic floor is made up of

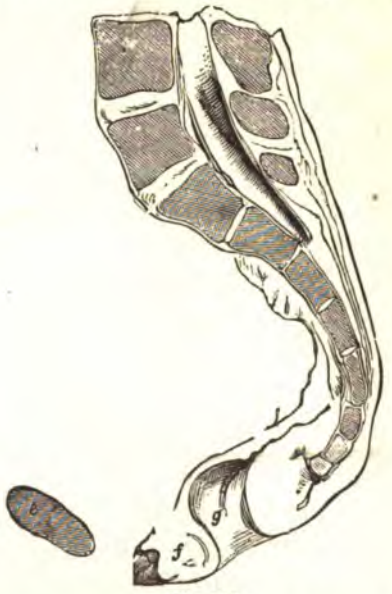

Fig. 319.

The sacral or supporting segment of the pelvic floor (Hart). *e*, symphysis pubis; *f*, perineum or inferior angle of sacral segment; *g*, anus.

pubic and sacral segments, as already defined; in labour, each of these behaves characteristically—the pubic segment is drawn up, the sacral one driven down.

In this chapter we are specially concerned with the sacral segment. During parturition it is driven downwards and backwards by the advancing fœtus and is more or less torn at its inferior angle. The term

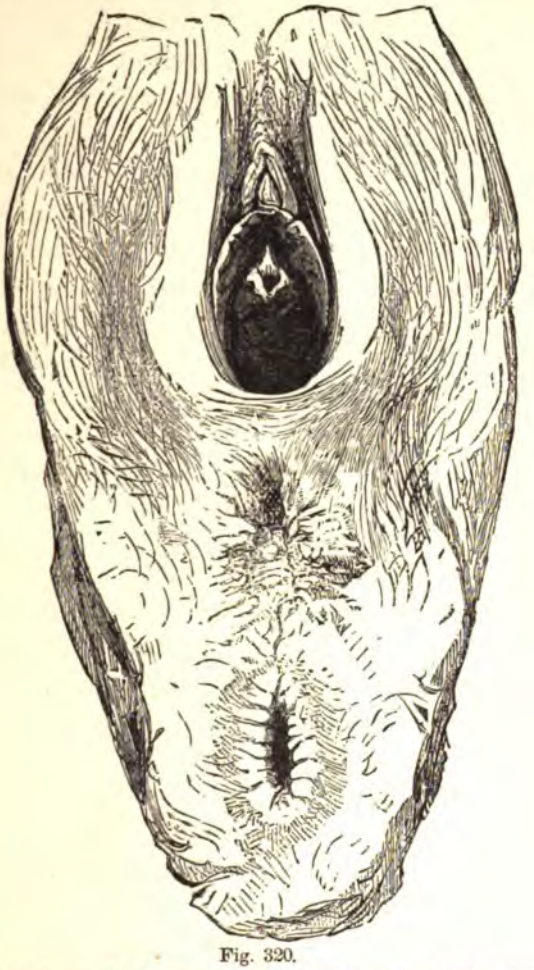

Fig. 320.

Central rupture of the perineum, the child was born not through the vulva but through the ruptured opening (Sir J. Y. Simpson).

perineum is often vaguely applied; in this chapter, however, the perineum is defined as *the inferior angle of the sacral segment* (*vide* Volume I., page 61). Figure 319 shows the perineum. At its lower end, this part of the pelvic floor is made up of the following:

1. Posterior vaginal wall.
2. Hymen.

3. Fossa Navicularis.
4. Fourchette.
5. Perineal body and skin over its base.

These are mesial structures; laterally, we have the labia majora and minora.

PATHOLOGY AND VARIETIES.

It should be kept in mind that the vaginal orifice is transverse, the vulvar orifice antero-posterior.

When the fœtal head is passing through the vaginal orifice, it distends it all round; while, when passing through the vulvar orifice, it distends the lower half of this only, *i.e.*, it does not stretch those parts of the vulva lying above the level of the meatus urinarius.

As the result of normal and abnormal childbirth, we get certain tears of the inferior end of the perineum. In all primiparæ there is at least one laceration of the vaginal orifice, usually mesially and posteriorly—the "inevitable laceration" of Mathews Duncan. There may be also laceration of the following structures: (*a*) of the vaginal orifice, radiating; (*b*) of vestibule; (*c*) of fourchette; (*d*) of labia minora; (*e*) of perineal body to a varying depth, the most extensive involving the sphincter ani. Further, there is sometimes central rupture of the perineum. In this lesion, the skin over the base of the perineal body alone may be involved or only the vagina may be torn. Rarely is it a lesion of vaginal wall, connective tissue, and skin, with an unruptured band of tissue between it and the fourchette (Fig. 320); this, therefore, is a perforation through the inferior angle of the thinned-out sacral segment.

ETIOLOGY.

The following causes produce rupture in parturition:

(1) Passage of a large head or of an occipito-posterior rotated into sacrum, passage of the shoulders;
(2) Narrowness of pubic arch;
(3) Straightness of sacrum, as in flat or rickety pelvis;
(4) Syphilitic ulceration;
(5) Rigidity of parts in elderly primiparæ;
(6) Careless use of forceps;
(7) Too early passage of hand into vagina to bring down arms in turning.

Comment on these would lead us too much into Obstetrics.

TREATMENT.

We take this up under the following heads:

a. Prophylactic;

b. Operative, immediate and deferred.

a. Prophylactic.—This properly belongs to midwifery. The obstetrician is too apt to think of the perineum as something that delays the exit of the fœtal head, and to forget the gynecological aspect—that it is the supporting segment of the pelvic floor. Extensive tear of this during labour means not only a larger raw surface for septic absorption, but also is one factor predisposing to prolapsus uteri. The question, therefore, of *support of the perineum* during parturition comes up here for consideration. To understand this we must keep in mind that the fœtal head, in passing through the outlet, drives the sacral segment back and glides forward in a direction parallel to the driven-back posterior vaginal wall. The normal curve of the sacrum favours this latter motion.

The perineum may tear (1) from over-distention of the orifice, or (2) from the too forcible driving of the fœtal head against it, *i.e.*, at right angles to the perineum. If, therefore, while the head is crowning and rupture threatening, the palm of the hand covered with a napkin be placed on the skin aspect of the perineum, we can by gentle support keep the head flexed, retard its progress somewhat, and elongate the perineum towards the pubic arch.

In addition the practitioner can materially help in preventing an awkward tear by the preliminary free inunction with medicated vaseline of the head, vagina and skin of perineum, and by tucking in the anterior vaginal wall when projecting too much over the occiput.

Goodell passes two fingers into the rectum and restrains the head with the thumb. The perineum should never be forcibly supported as this damages the vestibule. As regards the use of forceps, the authors have been struck with the fact that with axis-traction forceps the head can be brought over a rigid perineum with a minimum amount of tear.

b. Operative treatment; (1) immediate, (2) deferred. No practitioner should leave a labour case until he is satisfied, by actual inspection or digital examination, as to the amount of perineal tear. When the sphincter ani is involved, the operation is on no account to be deferred but must be performed at the conclusion of the third stage. The practitioner should never run the risk of his patient's having incontinence of fæces.

(1.) *Immediate Operation.*—When *the perineum is torn* to the edge of the anus, it is stitched as follows. Wait until the third stage is completed. The patient lies on the left side with the knees drawn up. Chloroform need not be given unless the patient insists on it. The raw surface is sponged with 1–40 carbolic lotion, and all bleeding arrested (usually by pressure). The tear has probably split the perineal body vertically and mesially, so that there is a triangular raw surface on each side continuous along the posterior side; the skin over the base of the perineal body forms the second side of each triangle, while the third is vaginal. By means of a fully curved needle armed with coloured silkworm-gut, stitches half an inch apart are passed as deeply as possible on the skin aspect of the perineal body; the same is done on the vaginal aspect although this is not always necessary. The vaginal stitches are tied first, and then the skin ones. Silver wire may be used in place of silkworm-gut. The patient's knees are kept tied together, and, if necessary, the urine drawn off by catheter for the first few days.

When the *sphincter ani is torn*, the stitches are passed just as before. The rectal sutures (catgut) are passed first, then the vaginal, and lastly the skin ones; the rectal ones are probably unnecessary.

The patient's food must be liquid, and the bowels should be kept confined for eight or nine days. Castor-oil is then given; the nurse must be instructed to inject oil when the bowels are about to move, and to break up and assist the passage of scybala. Some operators recommend that the bowels be moved every day by small doses of castor-oil—a plan worth trying.

The stitches are removed on the 8th or 9th day. The silkworm-gut irritates very little; in one case where a perineal stitch was overlooked, it gave no trouble in subsequent coitus and pregnancy. It was detected at parturition 10 months after and removed, when it was found to be quite unaltered; it had caused no irritation.

(2.) *Deferred Operation.*—This may be simply to repair the perineal body, or to operate for a rupture through the sphincter. The former will be considered under prolapsus uteri. At present we take up the operation for restoration of the ruptured sphincter ani.

Diagnosis of Long-standing Rupture of Perineum into Anus.—The patient complains of inability to control the passage of flatus or of fæcal matter when a call to stool happens; she is especially troubled when diarrhœa is present. Sometimes there is a certain amount of control, when

some of the fibres of the upper margin of the sphincter are intact. A patient in the lower classes occasionally treats her unpleasant condition as of little moment; to a woman of any refinement, the condition is a most distressing one.

On inspection, the practitioner notes that the skin surface between the vaginal and anal apertures is gone, so that these apertures are blended. The finger passed into the rectum feels no muscular constriction, and notes that the anterior and posterior rectal walls are in contact. The perineal body appears to be gone, and a V-shaped projection of cicatrised mucous membrane (apex above) is all that remains of it.

If the edges of this V-shaped projection be pared and stitched, the function of the sphincter is restored.

Operation for Restoration of Function of Sphincter Ani.—The patient's bowels are first freely cleared out by castor oil and enemata so as to ensure that no scybala remain.

The instruments requisite are the following:—

Straight knife,
Two pairs of artery forceps,
Dissecting forceps,
Catgut ligatures,
Silkworm-gut or silver wire,
Scissors,
Operating douche,
Fully curved needles, large and small,
Needle-holder.

The patient is chloroformed and placed opposite a good light in the lithotomy posture. The knees are held by assistants as follows. Each stands facing the light, and places a knee of the patient under the armpit next to it; with the hand of the same arm he exercises tension on the labium majus as the operator wishes. With his other hand, the assistant controls the patient's foot.

The stages of the operation are—(1) Making raw the mucous edges, (2) Applying the stitches.

The mucous edges may be made raw in two ways: (*a*) by splitting each edge with its constituents of rectal mucous membrane and vaginal mucous membrane, as introduced by Dr. John Duncan, Edinburgh; (*b*) by paring each edge with scissors.

The former is preferable and is performed as follows. Our aim in

operating is threefold; to close the anterior wall of the rectum, to close the posterior wall of the vagina, to construct a new perineal body between.

The incisions, as made by A. R. Simpson, are shown in Fig. 321. An incision is carried from the end of the septum (between the rectum and vagina) outwards on the inner surface of the labium to the point 1; a second incision is made from the point *a* parallel to the vulvar outlet, passing through the outer extremity of the first incision to *b* at the end of the torn sphincter. This is done on both sides.

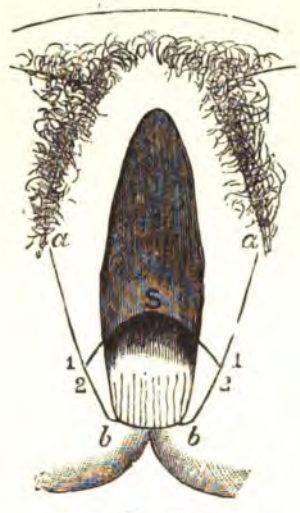

Fig. 321.

Lines of incision in operation for repair of rupture of perineum through sphincter ani. For letters, see text.

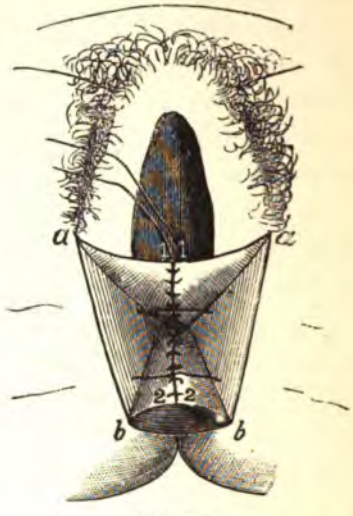

Fig. 322.

Passing of sutures in same operation. For letters, see text.

The two triangular flaps thus formed are dissected off as shown at Fig. 322. The flaps *a*, 1, *s*, are turned forwards to the vagina on each side to meet one another, so that the corners marked 1 in Fig. 321 take the position 1 in Fig. 322; the flaps *b*, 2, *s*, are turned backwards to the rectum, so that the corners 2 (Fig. 321) meet at 2 in Fig. 322.

Introduction of Stitches.—The vaginal flaps are stitched with wire or silk, care being taken to knot the threads *on the vaginal side* of the flaps; the sutures are left long so as to protrude at the vaginal orifice (Fig. 322). The rectal flaps are stitched with catgut, knotted *on the rectal side* of the flaps, and cut short.

We have thus closed in the vagina and rectum; the sides of the pyra-

midal-shaped raw area, thus formed, have to be brought together to construct the perineum. Two deep sutures are passed as in Fig. 322; they are of strong wire and are entered at a little distance from the skin edge.

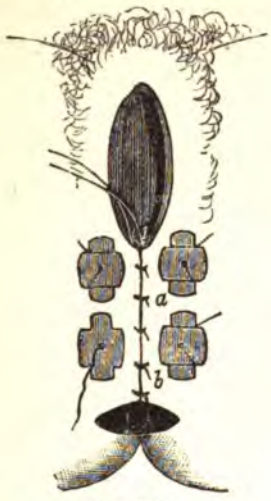

Fig. 323.
Result of same operation.

Bleeding, which can be checked by a stream of very hot water, should have ceased before we tighten up these sutures with button-plates (Fig. 323). Finally, superficial sutures bring together the skin edges which form the raphe of the new perineum along the line 1, *a*, *b*. The result is seen at Fig. 323.

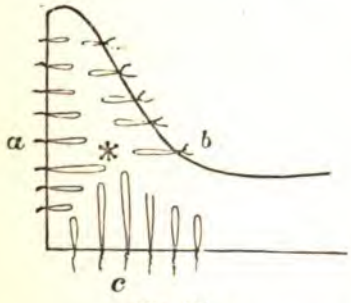

Fig. 324.
Position of sutures as seen in section. *a*, skin of perineum; *b*, vagina; *c*, rectum (Hildebrandt).

Hildebrandt draws attention to the risk of the collecting of discharge at the centre of the new perineal body indicated by the asterisk in Fig. 324. He thinks this is diminished by passing the sutures as in Fig.

325; the perineal ones are passed into the skin margin of one side posteriorly, out through the skin margin anteriorly, entered again through op-

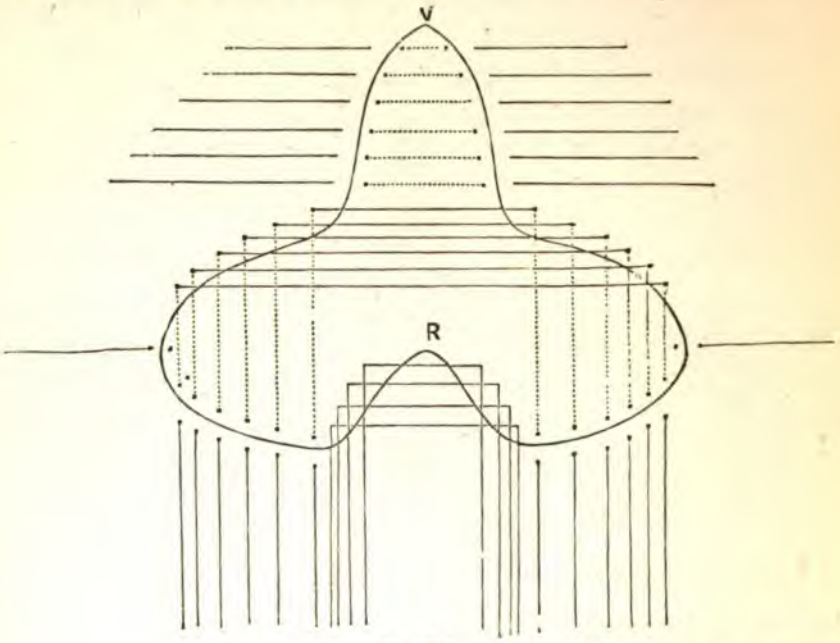

Fig. 325.

To show direction of sutures in operation for prolapsus uteri with complete rupture into rectum. *V*, apex of raw surface in vagina; *R*, in rectum (Hildebrandt).

posite skin margin anteriorly, and brought out again on same side posteriorly. The central space is thus constricted in a ring-like manner.

CHAPTER XLVII.

DISPLACEMENTS OF THE PELVIC FLOOR; PROLAPSUS UTERI; VAGINAL ENTEROCELE.

LITERATURE.

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PROLAPSUS UTERI.

STRUCTURAL AND ANATOMICAL PRELIMINARIES.

We have already considered (Vol. I., Chap. III.) the constructed anatomy of the pelvic floor, and therefore now briefly allude to only one or two points. The sacral segment is the supporting one, the pubic segment the displaceable one. If Fig. 35, Vol. I., be looked at, the following points can be noted:

(1) There is the pyramidal interspace behind the pubis, filled up with the retropubic fat;

(2) There is loose tissue between the anterior rectal and posterior vaginal wall;

(3) There is loose tissue between bladder and anterior vaginal wall.

This may be otherwise stated under this generalisation—those organs

in the pelvic floor (*viz.*, bladder, urethra and rectum) containing unstriped muscular fibre which enables them to diminish their lumen, are surrounded entirely or partially by loose tissue.

The pelvic floor has been constructed quâ parturition, rectal and vesical functions, and intra-abdominal pressure. From the loose tissue surrounding the bladder and rectum, evidently introduced to allow of their contraction, we get weak lines of cleavage in the pelvic floor at which it separates or becomes dislocated under increased intra-abdominal pressure. Thus strong pressure applied to the pelvic floor will cause it to bulge and displace all in front of the anterior rectal wall.

The student will recall (Fig. 15, Vol. I.) the division of the cervix into intra-vaginal, intermediate, and supra-vaginal portions.

SYMPTOMS AND PHYSICAL SIGNS.

The discomfort caused by the protrusion and the excoriation of the parts is the prominent symptom. The patient complains of "something coming down in front." Further, there is difficulty in micturition.

The physical signs are distinct. If the prolapsus be *incomplete*, a portion of the anterior vaginal wall has passed out at the vaginal orifice, the os uteri is equally displaced downwards, and the posterior fornix is apparently deeper from the descent of the cervix. The uterus, in addition to being low down, is usually enlarged ; it lies with its axis coinciding with that part of the pelvic curve in which it is. If the prolapsus be *complete*, we find the whole anterior vaginal wall outside, the cervix extruded, and the posterior vaginal wall everted (Fig. 171, Vol. I.). The student must specially note that this description is based on *clinical* observation.

From the *study of frozen sections*, we further learn that the posterior vaginal and anterior rectal walls are separated by peritoneum driven in between them, and that the uterus with other parts has become hypertrophied through long-standing congestion.

MECHANISM OF PROLAPSUS.

The displaced organs can be replaced—posterior vaginal wall first then uterus, and lastly pubic segment ; on the patient's straining, the mechanism of the displacement is repeated and is seen to be perfectly definite and to occur as follows :—

We have first the appearance of the anterior vaginal wall, from below upwards, at the orifice. *Pari passu* with its descent, the uterus and posterior vaginal wall have come down; its lowest point tracing out the pelvic curve, while the uterus becomes more and more inclined backwards until at the vaginal orifice it lies in the vaginal axis; the posterior vaginal wall forms a pouch, the depth of half its own length, behind it. Finally, the uterus is driven outside; the os sweeps upwards and forwards, and the posterior vaginal wall is now completely everted—its lowest part appearing last.

On vertical section, we now find these conditions: (1) Almost complete extrusion of the anterior or pubic part of the floor, the upper and anterior part of the bladder still behind the symphysis; (2) Complete extrusion of the uterus, which sometimes lies with the fundus below the level of the anus; (3) Rectum in position and only posterior vaginal wall down, the latter has peeled from the rectum downwards as far as the lowest inch and a half (of close connection) which is elongated (Fig. 326).

The *explanation of this mechanism* is as follows. The displacement in prolapsus uteri is caused by intra-abdominal pressure, pushing down that part of the pelvic floor which lies in front of the anterior rectal wall. This part consists of pubic segment, uterus, and posterior vaginal wall. The posterior angle of the pubic segment is attached to the cervix uteri, and the cervix uteri to the top of the posterior vaginal wall. Thus, when intra-abdominal pressure is excessive, this part when driven down must have the following sequence of protrusion at the vaginal orifice: (*a*) Anterior vaginal wall from below upwards; (*b*) Os uteri; (*c*) Posterior vaginal wall from above downwards.

The uterus, while it is being forced down, has the *direction of its long axis* continually altering. This is often expressed by saying that the uterus becomes more and more retroverted as it is forced down. The real fact is, that, as the pubic segment is forced down, it is stretched—chiefly on its peritoneal aspect. In this way tension is made on the cervix uteri, with the effect of throwing the fundus back and making it rest on the retrojacent structures. As these have (roughly speaking) the pelvic curve, we get the uterus in this way constantly altering its axislie.

The *enlargement* is not purely cervical; but affects the whole uterus, the pubic segment, and the posterior vaginal wall. This enlargement is a *consequence* of prolapsus uteri, and not a factor in its production. If we view a prolapsed uterus (with the os at the ostium vaginæ) through the

pelvic brim, it can be seen that it lies, as it were, at the bottom of a valley—the sides of the valley being the broad ligaments, the bed of the valley the uterus. The parts of the uterus do not lie on the same horizontal plane, the cervix lies low. It is thus evident that the venous supply of the uterus, having a mechanical disadvantage to its return, will have a tendency to stasis which will be most marked at its cervical end. This may lead to areola hyperplasia at first, and, so far as our present knowledge goes, accounts for the increasd size of the uterus in prolapsus.

DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS.

The diagnosis is made by noticing the relations of the parts extruded and by passing the sound if necessary into the bladder and uterus.

The differential diagnosis must be made from the following conditions.

(1.) *Hypertrophy of the infra-vaginal portion of the cervix;*

(2.) *Hypertrophy of middle portion of cervix.*

For both of these conditions the student is referred back to Vol. I, page 273 (see Figs. 161, 169, 170).

(3.) *Cystocele.* Uterus is in position, and displacement is found to be due to bulging back of posterior wall of bladder.

(4.) *Rectocele.* The finger, passed through the anus, can be pushed into the pouched rectum.

(5.) *Inversion and polypus* (*v.* pp. 69 and 127).

ETIOLOGY.

The factors producing prolapsus uteri are three in number: (1) *Deficient sacral support;* (2) *Deficient tone of pubic segment of pelvic floor;* (3) *Intra-abdominal pressure.*

Deficient Sacral Support.—By this is meant that through parturition the sacral segment has become straightened out or deficient at its lower margin—the perineum. It is wrong to imagine that tear of the perineum is everything in prolapsus uteri; the perineum may be considerably torn and yet, if the sacral segment is still sufficiently curved and the intra-abdominal pressure not too great, there will be no prolapsus. Tear of the perineum diminishes the sacral support, and deficient sacral support makes the task of intra-abdominal pressure easier. The bearing of the *second* and *third* factors is sufficiently evident. Of all the three, increased intra-abdomi-

nal pressure is the most important and is sufficient to cause prolapsus even in virgins. The first and second are adjuvant.

A dispute still exists as to the etiology of prolapsus uteri; some gynecologists assert that the perineal tear has little or nothing to do with it.

NATURE.

The uterus has nothing to do with prolapsus. It is a time-honoured term, but a misleading one. Prolapsus uteri is really *a hernia;* and is analogous in every point to what we term a surgical hernia (such as femoral hernia).

Thus it has (1) a *sac*, the peritoneum; (2) a definite road to travel along, whose boundaries are—*a*, in front the pubic symphysis, *b*, behind

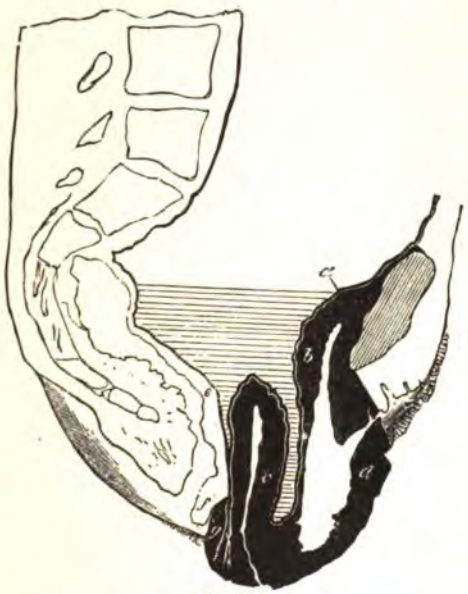


Fig. 326.

To show the hernial nature of prolapsus uteri. *a*, peritoneum; *b*, bladder; *c*, uterus; *d*, anterior vaginal wall; *e*, anterior rectal wall; *f*, perineum; *g*, posterior vaginal wall. The dark portions are the coverings of the hernia (Hart).

the portion of the sacral segment of the pelvic floor from anterior wall of rectum back to sacrum, *c*, side walls; (3) definite coverings, viz., *a*, pubic segment of pelvic floor, *b*, the uterus, *c*, posterior vaginal wall. Like all herniæ, its sac contains small intestine (Fig. 326).

Huguier alleged that, by a hypertrophic elongation of the supra-vaginal portion of the cervix, the bladder and posterior vaginal wall were

displaced downwards; and that many cases of alleged prolapsus uteri are really due to this. Such cases differed from prolapsus uteri in the fact that the fundus uteri and fundus of bladder are in position. Many gynecologists hold this view of Huguier, most of them modifying it somewhat. Schroeder's "Handbook," Goodell's "Gynecology," and Hart's "Structural Anatomy" may be consulted on this moot point.

TREATMENT.

A. Treatment by Pessaries.

B. Treatment by Operation.

A. Treatment by Pessaries.—In slight cases, where the anterior vaginal wall protrudes only a little, we may use an Albert Smith or Hodge pes-

Fig. 327.
Greenhalgh's pessary, with transverse bars.

Fig. 328.
Ring pessary with diaphragm.

sary with or without transverse bars at the lower part. If this fails, a ring pessary with spring inside should be tried; this instrument is useful here, inasmuch as it is shorter vertically than the Albert Smith, and, therefore, does not project over the lower end of the shortened posterior vaginal wall. The instrument may be made of vulcanite, block-tin, or india rubber. The india-rubber forms are best, and should be provided with a perforated diaphragm.

Fig. 329.
Simple elastic ring pessary, compressed between the fingers for introduction (de Sinéty).

The pessary is taken in the right hand, and compressed between the finger and thumb as in Fig. 329 while it is being passed through the vaginal orifice; the labia are separated with the fingers of the left hand.

If the ring instrument fail, then one of the so-called anteversion pessaries, such as that shown in Fig. 331, may be tried. Fig. 332 shows

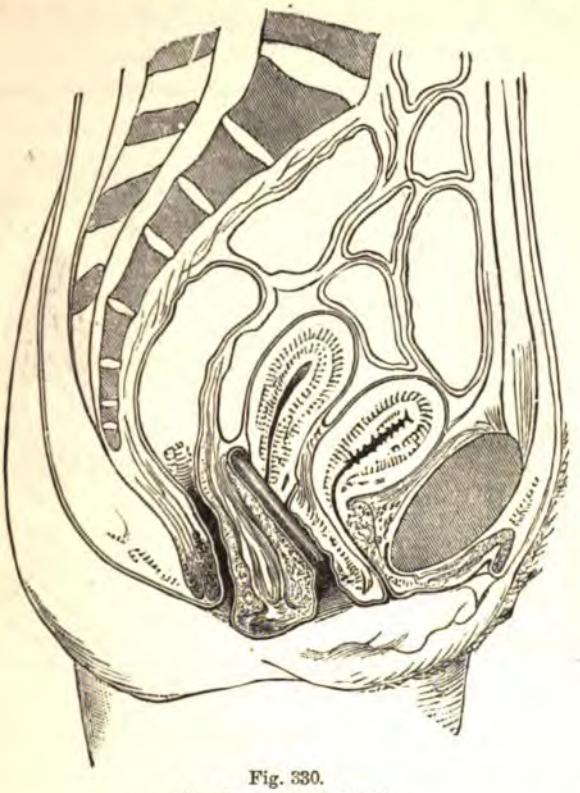


Fig. 330.
Ring pessary in situ (Hart).

Zwanck's pessary, a bad form. In very bad cases and in old women where an operation is out of the question, the patient or her friends

Fig. 331.
Pessary for prolapsus.

Fig. 332.
Zwanck's pessary for prolapsus.

should be instructed how to pack the vagina with marine lint; the packing, if thorough, may remain *in situ* for a week. Some recommend pessa-

ries which are attached externally to an abdominal belt. When there is much congestion and excoriation, rest in bed with the use of alum injections (℥j. to Oj.) and application of boracic or zinc ointments to the raw surfaces, is indicated.

If the patient has good abdominal development, an abdominal belt will

Fig. 333.
Lines of incision in operation for repair of ruptured perineum. For letters, see text.

Fig. 334.
Sutures passed in same operation.

be of use; when applied, it should be fairly tight at the lower edge and slack at the upper one.

B. Treatment by Operation.—We must first consider *the status quo* in an advanced prolapsus. There are the following primary and secondary lesions:—

Primary
(1) Perineal body usually torn;
(2) Increase of intra-abdominal pressure;

Secondary
(3) Congestion of uterus, pubic segment, and posterior vaginal wall;
(4) Separation of anterior rectal and posterior vaginal walls, with peritoneum clothing their surfaces.

These secondary lesions, especially the last, are serious and incurable. In order to restore the pelvic floor to its pristine state we should require (1) to repair the perineal body, (2) to restrain increased abdominal pressure; these are possible: (3) to do away with congestion and areolar hyperplasia is probably beyond our powers, while (4) to bring about

adhesion of the anterior rectal and posterior vaginal walls is impossible. *Prolapsus uteri is therefore a condition with serious and irremediable secondary results.*

The varieties of operative treatment practised are as follows:—

1. Repair of perineum;
2. Repair of perineum and paring of mucous membrane of posterior vaginal wall;
3. Making raw the mucous membrane of anterior vaginal wall;

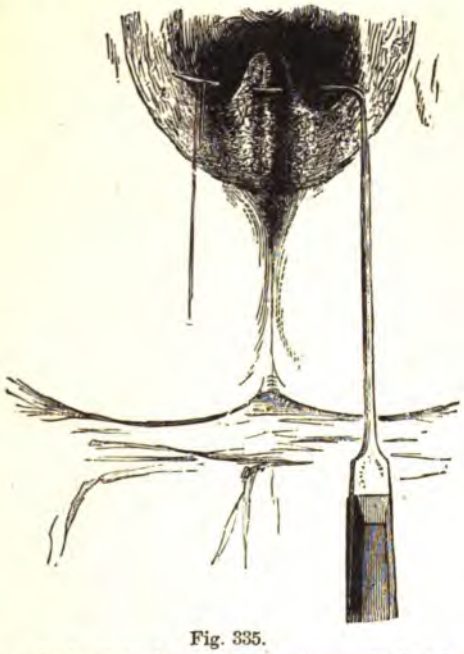


Fig. 335.
Needle carrying in stitches for repair of the perineum (Sir J. Y. Simpson).

4. Making a raw surface on each vaginal wall, and stitching them together.

Along with these, the vaginal portion of the cervix may be amputated.

1. *Repair of Perineum.*—A mesial incision is made from *b* to *c* along the posterior vaginal wall and ruptured perineum; a lateral one is carried forward on each side from the point *b* to *a* along the inner surface of the labium minus. The triangular flaps thus formed are dissected upwards so that their corners *b* (Fig. 333) lie as in *b* (Fig. 334); they are united with silk or wire sutures knotted on *the vaginal side.* Two deep sutures are passed as in Fig. 334 to close in the sides of the raw area left by the

flaps; the skin edges are united by superficial sutures. The result is seen at Fig. 336.

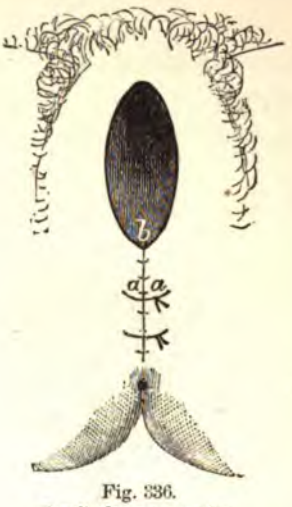


Fig. 336.
Result of same operation.

2. Repair of perineum and PARING of mucous membrane of *posterior vaginal wall.*

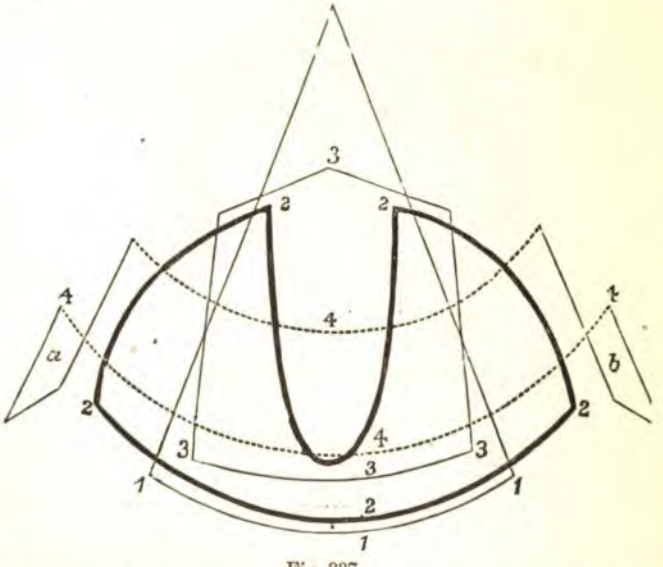


Fig. 337.
To show various forms of raw surface made on posterior vaginal wall in operation for prolapsus uteri. 1, 1, 1, 1, Hegar's; 2, 2, 2, 2, Bischoff's; 3, 3, 3, 3, Simon's; 4, 4, 4, 4. *a*, *b* Winckel's (Winckel.)

Fig. 337 shows the various forms of raw surface made by different gynecologists; the operation is a complicated one, especially the stitching.

Fig. 338 shows Martin's raw surface, and the relations of the parts when stitched.

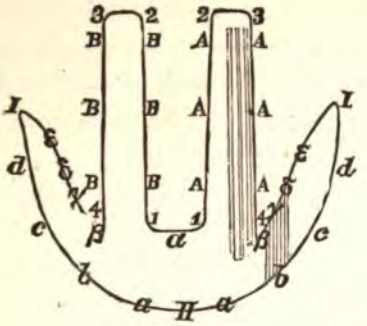


Fig. 338.

Raw surface as made by Martin. 1, 2, 3, 4, raw surfaces on posterior vaginal wall; I, II, raw surface round introitus. The surfaces 1–4 are united, A to A and B to B. The edge 4 β is turned in, with the corresponding one of opposite side, along the line a. The surface I, II, is united by sutures, so that the English and Greek letters are in opposition.

3. *Making a raw surface on mucous membrane of anterior vaginal wall.* The raw surface made by Sims is seen at Fig. 339.

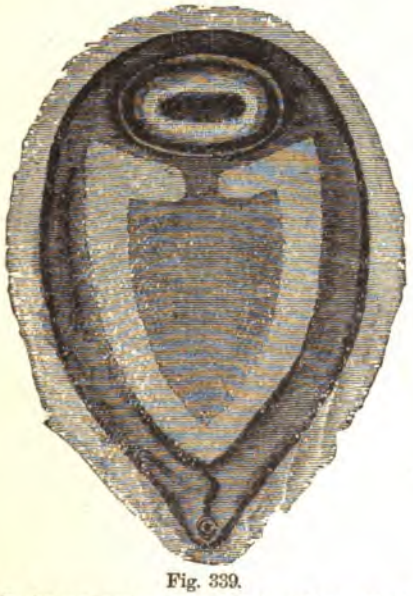


Fig. 339.

To show raw surface as made by Sims (Marion Sims).

4. *Making a raw surface on both vaginal walls, and stitching these surfaces together.*

These raw surfaces can be made with knife or scissors. Care should

be taken to avoid all excavation of tissue. Just so much tissue is to be removed as will give a rawness.

The result of any of these operations is not perfectly satisfactory. All of them aim at cicatrisation of the vaginal walls, and do nothing towards the amendment of the serious secondary results already described. When union by first intention is secured, there is risk that the cicatrix may stretch and the prolapse recur.

When the vaginal portion of the cervix is hypertrophied, it may be amputated at the same time.

Of all the raw surfaces recommended, Hegar's is probably the best and simplest.

If supra-vaginal elongation of the cervix causes a lesion like prolapsus uteri, prolapsus is an irremediable lesion, inasmuch as the proper treatment is excision of the cervix up to the level of the os internum. If the student looks at Figs. 169 and 170, Vol. I., he will see what this operation involves.

We would therefore sum up as follows. *The displacement of the pelvic floor—where pubic segment, uterus and posterior vaginal wall are driven down with the characteristic mechanism given at page* 232, *and where the serious secondary lesions of uterine enlargement and separation of the anterior rectal and posterior vaginal walls ensue—is a hernia; there is not sufficient evidence that this precise displacement is a hypertrophic elongation of the supra-vaginal portion of the cervix.*

Whether a gynecologist adopts Huguier's or the hernia theory, he usually operates as if the latter were the true one.

VAGINAL ENTEROCELE.

Of this there are two forms, *anterior* and *posterior*. Excessive intra-abdominal pressure usually displaces all of the pelvic floor that lies in front of the anterior rectal wall. Occasionally, but very rarely, intestine is forced down between the posterior aspect of the bladder and upper part of anterior vaginal wall, or between the anterior rectal and posterior vaginal walls (Fig. 340). We thus get a mass bulging into the vagina, but only affecting one wall; the uterus and cervix remain in position. This distinguishes it from prolapsus uteri and cervical elongation; by rectal examination, the posterior form of *enterocele* can be easily distinguished from retrocele.

The *causation* is not well known. In the posterior form, a deep dip of the peritoneum behind the posterior vaginal wall may have existed; but of this there is no evidence.

Treatment.—If an ordinary Albert Smith or anteversion pessary fail, an operation may be tried. In the posterior vaginal enterocele, for example, the protrusion should be replaced; a raw surface is then made

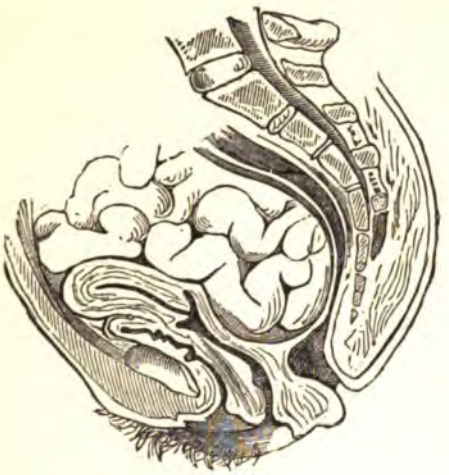


Fig. 340.

Posterior vaginal enterocele (Breisky).

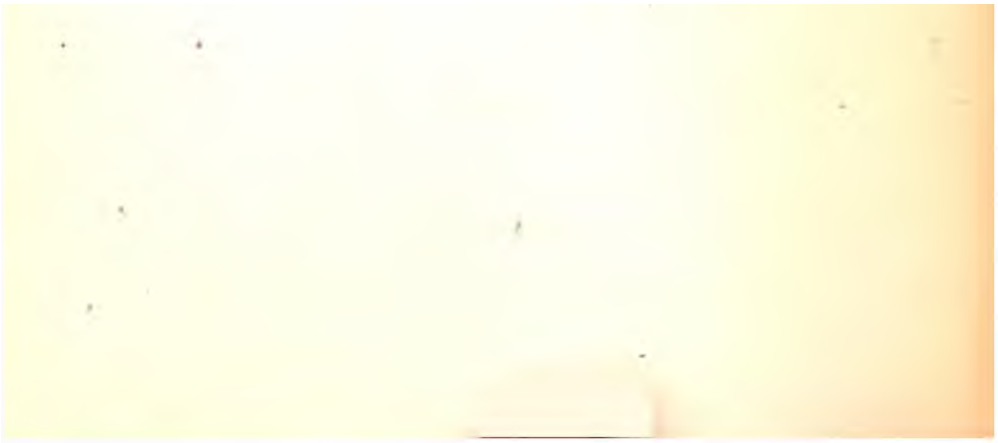
on the posterior lip of the cervix and a portion of the posterior vaginal wall about its middle; these surfaces are then stitched.

Prolapsus uteri and both forms of vaginal enterocele are therefore essentially the same in nature, viz., hernial. Intra-abdominal pressure usually displaces all in front of the anterior rectal wall; but may also force intestine in front of the anterior vaginal wall, or behind the posterior one.

SECTION VIII.

DISTURBANCES OF THE MENSTRUAL FUNCTION.

CHAPTER XLVIII. Amenorrhœa ; Menorrhagia ; Dysmenorrhœa.



CHAPTER XLVIII.

AMENORRHŒA; MENORRHAGIA; DYSMENNORRHŒA.

The three subjects to which this section is devoted are not diseases, but are symptoms of a large number of the more or less well ascertained pathological conditions already considered. Theoretically, therefore, they should not come up for special consideration; practically, however, it is of use to the practitioner to summarize the conditions causing these symptoms, and to give some special hints as to their treatment.

AMENORRHŒA.

This means cessation of menstruation during the period between puberty and the menopause. It is normal to have amenorrhœa during pregnancy and lactation. Amenorrhœa may be caused by the following *Local* conditions:—

Congenital . .	Absence or incomplete development of uterus and annexa, atresia of the genital canal (with or without accumulation of the menstrual blood), state of Cretinism;
Acquired . .	Superinvolution, simple atrophy of uterus, cystic ovarian disease, extensive inflammatory conditions of uterus and ovaries.

Constitutional conditions—such as phthisis, chlorosis (*v.* Appendix), prematurity of menopause—also cause amenorrhœa.

The local conditions have already been fully described under the various heads; we give here only a few hints as to the investigation of the causes of this symptom. When the patient complains of *never having menstruated*, and there is no constitutional cause for the amenorrhœa, the question of examination should always be entertained; abdominal palpation and rectal examination are employed to ascertain that there is no retention from atresia. To ascertain the condition of the uterus, a vaginal examination may be necessary. *Sudden cessation* of the menstruation in a girl neither phthisical nor chlorotic is usually due to pregnancy; early

sickness, mammary and other signs should be looked for. Nothing is a sure sign of pregnancy except the characteristic increase in the size of the uterus, agreeing with the number of periods passed.

MENORRHAGIA.

Menorrhagia is the term applied to excessive hemorrhage at the menstrual periods; when the hemorrhage is intermenstrual, it is termed metrorrhagia.

The causes of menorrhagia are the following:—

Constitutional.... Hemorrhagic diathesis, scorbutic conditions;

Local..... { Endometritis, metritis, subinvolution, retroversion of uterus, inversion of uterus, submucous and interstitial fibroids, polypi, carcinoma uteri, sarcoma uteri, incomplete abortion.

It should not be forgotten that we may have menorrhagia in cardiac disease, and also in hepatic congestion (Mathews Duncan, Warner).

The treatment of menorrhagia is the treatment of the condition producing it. In cardiac disease we give digitalis; and in hepatic disease we may try chloride of ammonium, euonymium or iridin.

℞. Ammonii chloridi ..... ʒ iij.
Aquae ..... ℥ vj.
Sig.—Table-spoonful thrice daily

℞. Euonymii
vel
Iridin..... gr. ii.
Pil. aloes et ferri..... q. s.
Fiat pilula: mitte tales xij.
Sig.—One at night.

In cases where there is menorrhagia due to a simple congested condition or to a flabby state of the uterine muscle, we may give the following at the menstrual periods:—

℞. Ergotinæ ..... gr. iv.
Argenii oxidi..... gr. ¼.
Mica panis ..... q. s.
Fiat pilula: mitte tales xij.
Sig.—One thrice daily as directed.

Note that it is well not to write "at the menstrual period" on the prescription, but to put "as directed." When the practitioner is consulted as to menorrhagia in unmarried ladies or young girls, he should first try the ergotin and oxide of silver pill. If this fail and the case be urgent, he should request a local examination. If this be declined, the responsibility rests with the patient.

Ergot may be given also as follows:—

℞. Ergotæ liquidi extracti ..... ℥ ij.
Sig.—Thirty drops as directed.

or

℞. Ergotinæ ..... gr. iv.
Fiat suppositorium: mitte tales xij.
Sig.—As directed.

Inform the patient that two suppositories are to be passed into the rectum each morning after the bowels move.

In some cases the hypodermic injection is required (*v.* p. 103).

DYSMENORRHŒA.

LITERATURE.—*Duncan*, *Mathews*—Clinical Lectures, p. 131. *Goodell*—Op. cit. *Gusserow*—Menstruation and Dysmenorrhœa: Germ. Clin. Lect., New Syd. Soc. Tr., 1877. *Solowieff*—Decidua Menstrualis: Archiv. f. Gyn., Bd. II., S. 66. *Schroeder*—Op. cit. *Simpson*, *Sir J. Y.*—Op. cit., p. 225. *Williams*, *John*—Pathology and Treatment of Membranous Dysmenorrhœa: Lond. Obst. Tr., 1877.

Dysmenorrhœa may be defined as the occurrence of pain just before, during, or after the menstrual period.

The pain of dysmenorrhœa varies greatly in intensity. It may be so severe as to render the sufferer a miserable invalid, it may interfere with her work more or less, or it may cause only marked uneasiness. It is always advisable in cases of dysmenorrhœa to ascertain how much the pain interferes with the patient's occupation or whether it confines her to bed. Note also when the pain occurs—prior to, during, or after the blood-flow; in the spasmodic form, it is during the flow.

In order to treat dysmenorrhœa intelligently, we must endeavour to ascertain its cause and try to make out how this condition brings about the pain. We know nothing at all as to the real cause of dysmenorrhœa.

We know that in many instances it is associated with certain pathological conditions, but how these actually cause the pain is as yet disputed.

In normal menstruation, a fluid made up of blood and epithelial debris escapes from the uterus. Probably, it does not drain away by mere capillary action but is expelled by uterine contractions. There is no absolute proof of this, but it is a fair deduction from certain facts. Thus we have seen the pelvis filled with fluid after rupture of the uterus, and yet none had drained away through the large rent.

Dysmenorrhœa is usually divided into certain forms. It is to be regretted that this has been done, because there have not been collected pathological facts sufficient to warrant a classification. The forms usually given are the following :—

1. Dysmenorrhœa associated with certain diatheses, such as the gouty and rheumatic ;
2. Spasmodic dysmenorrhœa ;
3. Membranous dysmenorrhœa ;
4. Dysmenorrhœa associated with inflammatory conditions of the ovary, peritoneum or cellular tissue ;
5. Ovarian dysmenorrhœa.

The last term is applied to certain cases which were supposed to be specially connected with the ovaries and which could not be classified under the preceding heads. The term is a most unfortunate one. It assumes a cause for dysmenorrhœa which is not, as yet, demonstrated ; and, instead of pathological facts or a confession of our ignorance of them, gives us what we have too much of already—erroneous terminology.

So far as our present knowledge goes we can speak of three varieties :

1. Spasmodic dysmenorrhœa ;
2. Membranous dysmenorrhœa ;
3. Dysmenorrhœa associated with maldevelopment of the sexual organs, pyosalpinx, fibroma uteri, rheumatic diathesis, and some other unknown causes.

1. *Spasmodic dysmenorrhœa.*—Of this the most frequent cause is pathological anteflexion, *i.e.*, anteflexion of the uterus produced by inflammation in the utero-sacral ligaments with cicatrisation. The pathology, diagnosis and treatment of this affection is given at pp. 20–33. We only remark here that it is a very serious lesion owing to its inflammatory etiology. From the flexion produced we get spasmodic uterine contraction, accompanied with very great pain and expulsion of clots. Two theories of

dysmenorrhœa have been already explained (p. 24). Those who hold the purely mechanical theory seem to forget that fluid blood passes easily through a capillary. Does any one believe that the lumen at the flexion is less than that of a capillary?

Spasmodic contraction of the os internum and constriction of the cervical canal are also advanced as causes.

2. *Membranous dysmenorrhœa.*—In this condition, the superficial layer of the mucous membrane is cast off as a coherent triangular sac or in shreds of a more or less firm consistence (Figs. 341, 342). This may result from the occurrence of hemorrhage in the deeper layers of the mucous

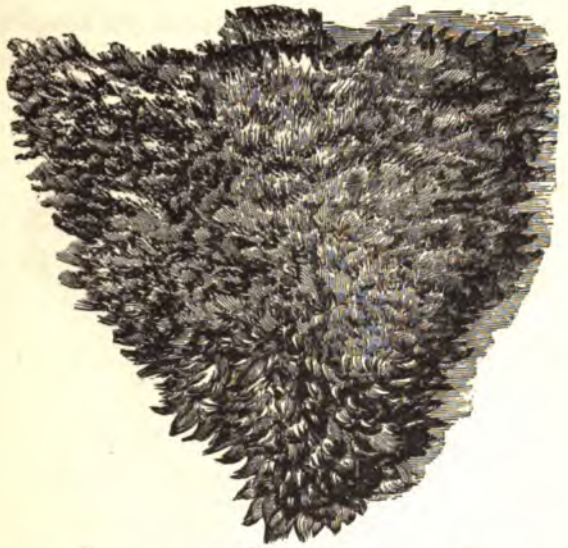


Fig. 341.
Sketch of a dysmenorrhœal membrane as seen under water (Sir J. Y. Simpson).

membrane; and then we can understand that, according to the depth, we have present no part of the glands or only their cœcal extremities (Solowieff and Gusserow). Microscopically, there is excess of round cells and fibrillated tissue in the membrane.

Williams of London, who has written ably on this subject, believes that, owing to an excess of fibrous tissue in the walls of uterus, the mucous membrane is expelled in coherent shreds. This excess of fibrous tissue is due to defective evolution, subinvolution, or metritis. The membrane is, further, never a plastic exudation. *It is of the greatest importance to remember that it is not a product of conception and should not be mistaken for an early abortion.*

3. *Dysmenorrhœa from other causes, as defective development of uterus, etc.*—Many of these conditions are now being elucidated by abdominal section undertaken for Battey's operation.

TREATMENT.

At the outset we are met with a difficulty. As we are usually consulted for dysmenorrhœa in unmarried women, the question of the propriety of a pelvic examination comes up. As Duncan has said—"No rules that I can give you will make up for want of good sense and good feeling on your own part, but I shall give you some hints. The first is that you should, as a rule, not resort to this treatment (by bougies) in an unmarried young woman without the concurrence of three parties—firstly,

Fig. 342.
A dysmenorrhœal membrane laid open (Coste).

your own approval; secondly, that of the mother or guardian of the patient; and, thirdly, that of the patient herself. All of these should be quite aware of the circumstances, and of what it is proposed to do."

Nothing can be more reprehensible than the vaginal examination of unmarried women for trifling ailments. When the Dysmenorrhœa is slight, make no examination but order some such mixture as the following.

℞. Spiritus chloroformi,
Spiritus ammoniæ, aromaticæ.....āā ℥ ss.
Liquoris ammoniæ acetatis ..... ℥ iss.
Sig.—Teaspoonful in a wine-glass-full of hot water, occasionally.

Order a hot hip bath, or the feet to be put in mustard and water. On no account whatsoever allow alcohol in any form to be given. If the mother has been giving whisky and water or gin and water, at once point out the risk the patient is running. Do not give morphia, or other opiate, unless driven to it; always give it yourself and hypodermically, never by the mouth or rectum, and give no prescription for it.

When the Dysmenorrhœa is urgent, then an examination should be advised; the index finger well oiled can usually pass in without much pain.

If pathological anteflexion is found, note the amount of inflammatory disturbance, the degree of flexion, and the implication or non-implication of the ovaries. Begin by ordering blisters to the iliac regions, bromide of potash, the glycerine plug, and the hot vaginal douche. See that the bowels are regulated, and soft motions secured by the use of liquorice powder (Pulv. glcyrrhizæ co.) and occasional enemata. Note the effect of this for some periods; and then, if unrelieved, pass sound or graduated bougies or use uterine dilator. This course benefits the Dysmenorrhœa, and it is safer than the use of stem pessaries; the dilatation by bougies seems to act like the stretching of the sphincter ani in fissure of the anus. In certain cases, Sims' operation is required (*v.* p. 32).

If the Dysmenorrhœa is membranous, treatment is of little service. The following prescriptions may be tried.

℞. Liquoris arsenicalis..... ℥ ij.
Sig.—Three drops in water thrice daily.

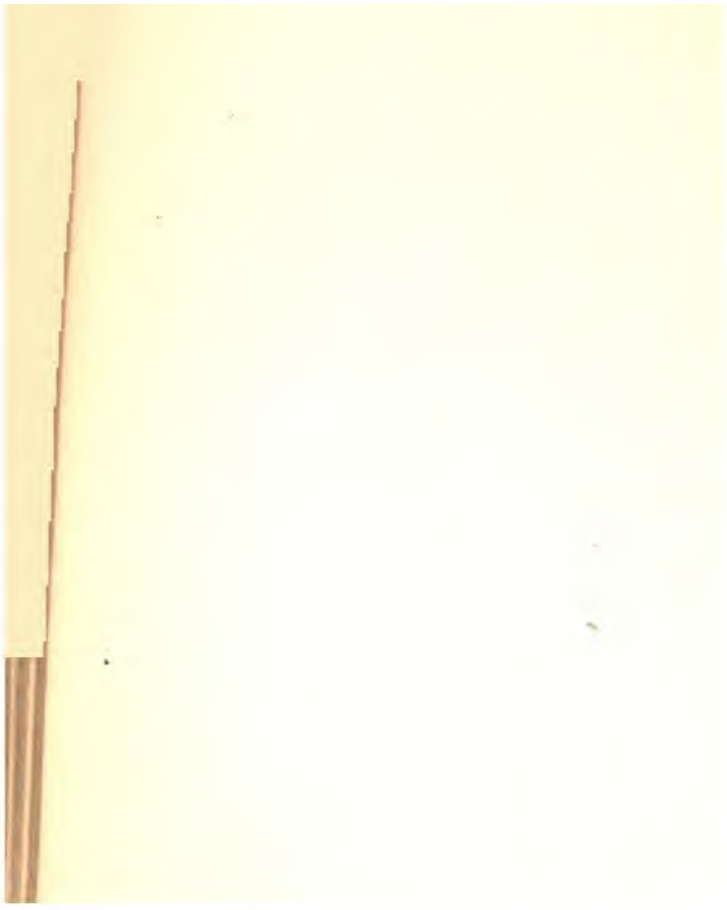
℞. Liquoris arsenici et hydrargyri hydriodatis..... ℥ ij.
Sig.—Five drops in water thrice daily.

The action may be analogous to that of arsenic in Psoriasis.

Treat any endocervicitis or stenosis of cervix present. The prognosis is unfavourable as to cure. The patients are not necessarily sterile.

In the third class of cases, Battey's operation has not given the results anticipated. We have not as yet, however, facts warranting any dogmatic utterances. Where the ovaries are developed but not the uterus, with serious menstrual molimina resulting in consequence, Battey's operation is undoubtedly indicated. We hope that abdominal section, as now practised by many gynecologists, will lessen the number of otherwise incurable cases.

Where any diathesis (rheumatic or gouty) is supposed to influence the Dysmenorrhœa, guaiac, colchicum and such specific drugs may be given.



SECTION IX.

DISTURBANCES OF THE REPRODUCTIVE FUNCTION.

CHAPTER XLIX. Sterility ; Abortion ; Retroflexion of the Gravid Uterus.

L. Extra-uterine Gestation.

CHAPTER XLIX.

STERILITY; ABORTION; RETROFLEXION OF THE GRAVID UTERUS.

LITERATURE.

STERILITY. *Duncan*, *Mathews*—Fecundity, Fertility, Sterility and allied topics: Edinburgh, A. & C. Black, 1866. *v. Grünewaldt*—Ueber die Sterilität geschlechtskranker Frauen: Archiv. f. Gyn., Bd. 8, Hft. 3, 1873. *Kehrer*—Archiv. f. Gyn., Bd. 10, Hft. 3. *Mayrhofer*—Sterilität des Weibes, etc., Billroth's Handbuch: Stuttgart, 1882. *Sims*, *Marion*—Uterine Surgery. *Simpson*, *Sir J. Y.*—Obstetrics, p. 830.

ABORTION. *Hegar*—Monats. f. Geburtskunde, Bd. 21, Suppl. S. 1. *Simpson*, *A. R.*—On the Complete Evacuation of the Uterus after Abortion: op. cit., p. 104. *Whitehead*—On the Causes and Treatment of Abortion and Sterility; London, 1847.

STERILITY.

By sterility is understood that conception has not taken place, not that it is impossible. So little is known on the physiology of normal conception that our considerations with regard to sterility must be mostly theoretical. We do not know at what time a Graafian follicle ruptures, which ovum is fertilised, how long the ovum takes to pass down the Fallopian tube, at what point it is impregnated, what the circumstances are which diminish its vitality and lessen the probability of its impregnation. The rarity of conception, although an ovum capable of fertilisation is discharged at each monthly period during the whole time of sexual activity, shows that a great variety of conditions must be essential. According to Farr, the average number of children to each marriage in Great Britain is 4.2 per cent., which contrasts strikingly with the number of ova matured during married life.

With regard to sterility we should advance the following considerations. *First*, the spermatic fluid must contain spermatozoa, and these must possess vitality high enough to impregnate the ovum; according to

Kehrer, one-fourth of the cases of sterility is due to the non-fulfilment of this condition. *Second*, acid solutions at once destroy, while alkaline solutions preserve, the vitality of spermatozoa; the secretion of the vagina is therefore destructive. *Third*, as the spermatozoa are microscopic structures, mere stenosis of the genital canal cannot mechanically prevent their passage. *Fourth*, pelvic inflammation binding down the ovaries or displacing the Fallopian tubes will produce sterility. *Fifth*, under the causes of sterility we must include not only those which prevent impregnation of the ovum but those which hinder its attachment to the uterus. The fertilised ovum is implanted, as it were, in the uterine mucous membrane by the root-like chorionic villi; pathological changes in either of these structures prevent the ovum from becoming firmly rooted or from receiving the requisite nutriment.

Sterility is found associated with the following conditions already described:—vaginismus, Vol. II., p. 203; hypertrophied cervix, Vol. I., p. 267; conical cervix with pin-hole os, Vol. I., p. 255; cervical catarrh, Vol. I., p. 293; anteflexion, Vol. II., p. 24; retroflexion (more rarely), Vol. II., p. 44; endometritis, Vol. I., p. 305; ovaritis, Vol. I., p. 195; pelvic peritonitis, Vol. I., p. 163. The last three are probably the most important. The treatment of these has been already described. Cases of vaginismus and contracted os externum are the most hopeful as regards the cure of the sterility; with retroflexion the replacement of the uterus is sometimes followed by conception, but in these cases the patient is rarely a nullipara.

ABORTION.

Abortion is so important a factor in the causation of uterine disease that its proper management calls for notice in a work on Gynecology. Many cases of endometritis and metritis may be traced back to a mismanaged abortion.

The cause of abortion may be (1) in the fœtus or (2) in the mother. On the part of *the fœtus*, disease of the chorion and hemorrhage into the fœtal part of the placenta produce death of the fœtus and consequent abortion; these conditions are most frequently due to syphilis. On the part of *the mother*, endometritis and metritis are the most important causes. General debility and fevers (typhus and scarlet) also produce abortion. Patients show a marvellous ingenuity in tracing back miscarriage to a mechanical cause, such as a violent muscular effort; the cause is rarely of

this nature, although it is evident that a severe blow or fall might lead to hemorrhage and separation of the membranes. When the fœtus dies at the second or third month and is not immediately expelled, it is a "missed abortion;" in such a case the fœtus does not putrefy but shrivels up and becomes mummified. In a case reported by Mathews Duncan, the fœtus died at the second month but remained in the uterus for other five months, during three of which the amenorrhœa continued.

The treatment of *threatened abortion* is to keep the patient recumbent, perfectly quiet, and under opium if necessary; where there is hemorrhage, ergot (liquid extract) in *ten minim doses* every few hours will check it without expelling the ovum.

In the management of abortion in a patient who is the subject of chronic inflammation of the uterus, two points require special attention. *The patient should lose as little blood as possible:* hence, when abortion is imminent, the case should not be allowed to drag on for days in the hope that the abortion may be staved off—the doubtful life of the fœtus is of little value compared with the health of the mother; and besides there will, probably, soon be a second conception and the proper management of this abortion will have brought the uterine mucous membrane into a condition more favourable for pregnancy. *The uterus should be completely evacuated*, and as long a period of rest allowed for involution as after a full-time labour.

To secure these ends we proceed as follows. The vagina having been washed out with carbolised water, a large-sized sponge-tent is passed fairly into the cervix; this is facilitated by drawing down the cervix with the volsella. After 8 or 10 hours, the os should be sufficiently dilated to admit one or two fingers.

The patient is put under chloroform, as this greatly facilitates the bimanual manipulation. A douche of hot carbolised solution (2 per cent.) is prepared, a nozzle the size of a catheter being fixed on to the tube—the sponge-tent, if not already expelled, is withdrawn, and two or three fingers (if possible, the whole hand) are passed into the vagina. One or sometimes two fingers are introduced through the cervical canal into the body of the uterus, and made to sweep round and round the wall so as to detach the decidua on all sides. If there is room at first for only one finger, a second may be slowly introduced so as gradually to stretch the canal; the uterus is at the same time grasped through the abdominal wall with the left hand, and pushed down upon the fingers of the right hand

until they reach the fundus. No portion of the ovum is removed until the whole is felt to be perfectly free within the uterine cavity. To remove the ovum, hook (not pull) it down with the fingers. The two fingers are the best pair of abortion forceps, although various forms of instrument have been devised.

The uterus having been thus completely emptied, the nozzle of the douche is carried up to the fundus and the cavity gently washed out with the hot carbolic solution; this prevents hemorrhage and septicæmia. Twelve minims of the ergotin solution (3 grs.) are given hypodermically. The patient keeps at rest for a fortnight or three weeks.

RETROFLEXION OF THE GRAVID UTERUS.

This condition belongs properly to obstetrics; it is important, however, to the gynecologist in regard to differential diagnosis, and has been so frequently mentioned in this connection that it requires brief notice here.

When conception occurs in a retroflexed uterus, it may right itself (*v.* p. 44); how often it does so we do not know, as we only see those cases in which reposition has not taken place. Compared with the frequency of this displacement in the non-pregnant uterus, Retroflexion of the Gravid Uterus rarely comes under our notice. Among the patients admitted to the Buchanan Ward during the last two years, we have seen only four cases.

At the fourth month, the retroflexed gravid uterus is of such a size that it fills the pelvis and presses on the bladder and rectum; the relation of the pelvic organs will be evident from Fig. 343.

The diagnostic symptoms are *retention of urine and four months amenorrhœa;* sometimes there is constant dribbling of urine from over-distention, which may mislead the practitioner. Complete retention is often first noticed on the patient's having retained water for a longer period than usual. Catarrh of the bladder, and even exfoliation of its mucous membrane, arises secondarily. Further, there is difficulty in defæcation, and, when the pressure is great, pain in the pelvis. The usual symptoms of pregnancy are also present.

The *physical examination* shows a fluctuating tumour in the abdomen reaching to the umbilicus and usually to the right of the middle line—this disappears on using the catheter; the vagina is elongated and compressed against the pubis; the cervix may be more accessible than usual, more frequently it is high up and may be above the pelvic brim; the pos-

terior fornix is depressed by an elastic tumour which fills the pelvis, and is found on combined recto-abdominal examination to be the retroflexed uterus. The bladder is lifted upwards into the abdomen (*v.* Vol. I., p. 34).

Reposition may occur spontaneously after the urine has been drawn off and the bowels have been thoroughly emptied by a purge and enema; the patient is instructed to pass water every hour. After a day or two if reposition has not occurred, or at once if the uterus is found to be firmly wedged and the symptoms are distressing, we replace it in the following way. The patient is placed in the genupectoral posture, and steady pressure is made on the bulging tumour in the posterior fornix by two fingers

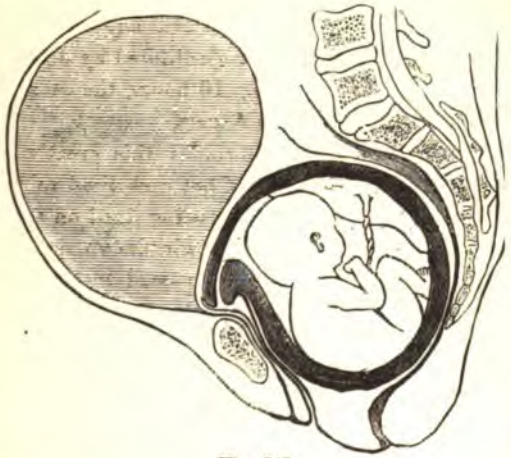


Fig. 343.

Retroflexion of the Gravid Uterus producing, through compression of the urethra, distention of the bladder; it also presses on the rectum (Schroeder).

per rectum; the cervix is at the same time drawn downwards with the volsella (*v.* Fig. 212).

An interesting process of gradual spontaneous reposition occurred in one of the four cases referred to. The portion of the uterus above the brim, as it increased in size, drew the portion wedged in the pelvis upwards into the abdomen.

Sometimes the pregnant uterus expands into the abdomen while a portion remains wedged below the promontory. Such a condition seriously complicates the labour, as in the case reported by W. L. Reid.[1]

[1] On a Labour Obstructed from an Unusual Cause: Trans. Edin. Obst. Soc., Vol. V., Part III., p. 36. This condition is also referred to by Pallen: A Case of Abdominal Pregnancy Treated by Laparotomy: Amer. Journ. of Obst., July, 1880.

CHAPTER L.

EXTRA-UTERINE GESTATION.

LITERATURE.

Bandl—Die Krankheiten der Tuben, etc. : Stuttgart, 1879, S. 41. *Barnes*—Op. cit., p. 339 ; and Lond. Obst. Trans., XIV., p. 325. *Hecker*—Beitr. zur Lehre von der Schwangerschaft ausserhalb der Gebärmutterhöle : Monats. f. Geburtskunde, Berlin, 1859, Bd. XIII. *Hennig*—Die Krankheiten der Eileiter u. die Tubenschwangerschaft : Stuttgart, 1876. *Parry*—Extra-uterine Pregnancy : Lewis, London, 1876. *Reeve*—A Case of Extra-uterine Pregnancy, with Successful Application of Electricity : Amer. Gyn. Trans., 1879, p. 313. See discussion on this paper. *Schroeder*—Lehrbuch der Geburtshülfe : Bonn, 1880, S. 401. *Spiegelberg*—Lehrbuch der Geburtshülfe : Lahr., 1878, S. 308. *Thomas*—Op. cit., p. 765. The student will find the pathology most fully in Bandl, the diagnosis and statistics of the various modes of treatment in Parry.

This comparatively rare condition concerns the gynecologist as much as the obstetrician ; the cases come under notice at an early period of pregnancy and, in symptoms and diagnosis, have much in common with purely gynecological cases ; the treatment belongs more to operative gynecology than to obstetrics.

PATHOLOGY.

The following is the course of the fertilized ovum in its passage to the uterus : Graafian follicle, fimbriated end of Fallopian tube, canal of Fallopian tube, interstitial (within uterine wall) portion of Fallopian tube, horn of uterus. It may be arrested at any point in this course and, becoming attached, pass through the stages of fœtal development just as it does in the uterine cavity.

Of *extra*-uterine gestation, there are therefore the following varieties : ovarian and abdominal, tubo-ovarian, tubal, interstitial, and that which occurs in an isolated horn.

As to the frequency of extra-uterine gestation, Bandl mentions that

out of 60,000 gynecological and obstetrical cases (received during seven years at the cliniques of Carl Braun and Späth in Vienna) there were only 5 cases.

As to the relative frequency of the various forms, tubal gestation is the most common—about two-thirds of all the recorded cases.

Whether there is an ovarian gestation, by which we understand that the ovum is fertilised in the Graafian follicle and continues to grow there, is a disputed point; Schroeder holds that many cases described as ab-

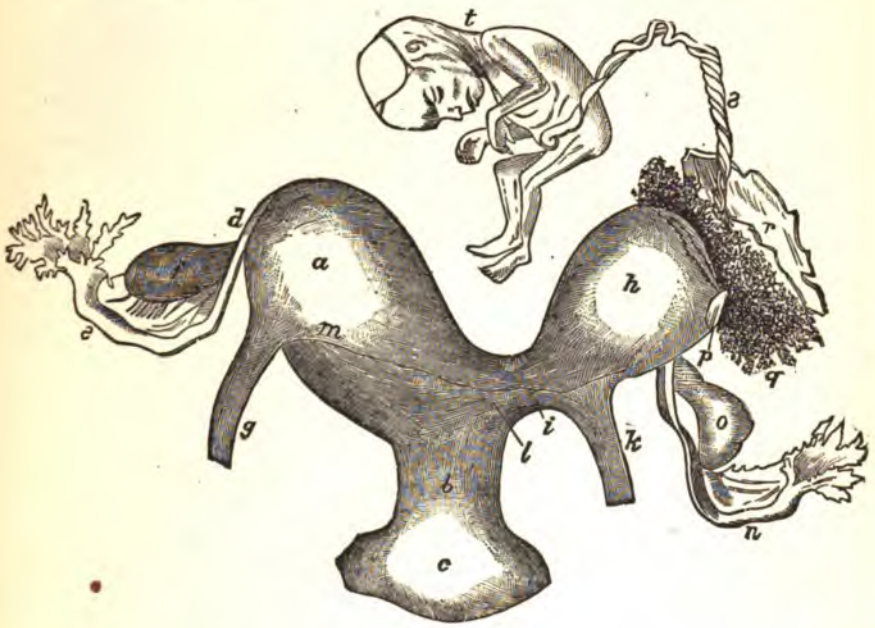


Fig. 344.

Gestation in the detached left horn. *a*, right horn of uterus; *b*, neck; *c*, vagina; *d*, point of right horn; *e*, right Fallopian tube; *f*, right ovary; *g*, right round ligament; *h*, detached left horn; *i*, its connection with uterus; *k*, left round ligament; *l*, muscular fibre springing from the left round ligament and passing to the right horn; *m*, margin of peritoneum dissected off; *n*, left Fallopian tube; *o*, left ovary with corpus luteum; *p*, seat of rupture with everted margins; *q*, placenta; *r*, membranes; *s*, cord; *t*, fœtus (Kussmaul, reported by Heyfelder).

dominal were really ovarian, that is that the ovum was fertilised while in the ruptured Graafian follicle and developed within it.

After the gestation has gone on for some months, the structures in the broad ligament become displaced by the tumour and obscured by adhesions, so that it is impossible to say where the ovum began to grow. Cases of abdominal gestation probably begin as tubal or tubo-ovarian.

Gestation in the isolated horn of a uterus bicornis has been already re-

ferred to (*v.* Vol. I., p. 248) and a case of it has been described (*v.* Fig. 145, Vol. I.) ; Fig. 344, taken from Kussmaul, represents a case reported by Heyfelder.

In interstitial gestation, the fertilised ovum has been arrested in the tube at its uterine end where it passes through the substance of the wall of the uterus ; in these cases it was supposed that the ovum was growing interstitially, in the substance of the wall. This form of gestation is seen at Fig. 345.

Fig. 345.

Interstitial gestation. *a*, body of uterus ; *b*, cavity laid open from the front ; *c*, embryo sac in wall of uterus ; *d*, ovum with branching villi ; *e*, place where the placenta is forming and is still adherent to the wall of the uterus ; *f*, Fallopian tubes ; *g*, ovaries ; *h*, broad ligaments ; *i*, cervix ; *k*, vagina.

The two structures which call for special notice are (1) the wall of the gestation sac and (2) the placenta.

The *wall* of the sac consists, in a tubal gestation, of the dilated Fallopian tube ; this does not develop with the developing fœtus (as the uterine wall does) and hence, when the latter has grown till about the 2d or 3d month, it ruptures from the strain. When the ovum is growing at the fimbriated end or in the abdominal cavity, the wall is formed by adhesions ; these yield, and when they rupture new adhesions form outside ;

hence the sac is capable of increasing in size. Tubo-ovarian and abdominal pregnancies go on for a longer period than tubal—even to full time.

The Placenta.—The mucous membrane of the tube hypertrophies and forms a highly vascular areolar tissue; a structure analogous to the decidua serotina is thus formed, in which the chorionic villi are embedded (Rokitansky).

The uterus itself undergoes the changes of pregnancy. It becomes softer and larger, a decidua forms in its cavity (Fig. 346); these changes are most marked in interstitial, less constant in tubal, and still less so in

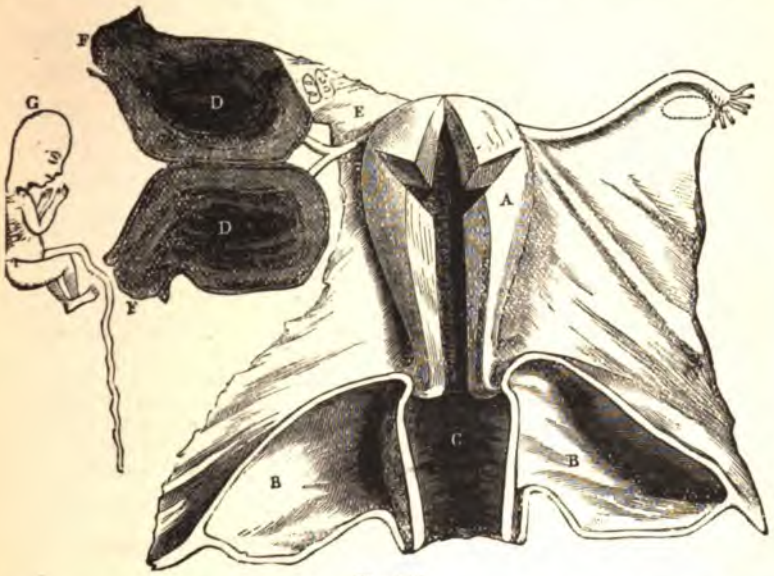


Fig. 346.

Fallopian-tube gestation which has burst. *A*, uterus with decidua; *B*, bladder; *C*, vagina; *D*, gestation sac which has ruptured at *F*; *E*, posterior layer of broad ligament turned up so as to show ovary with corpora lutea; *G*, fœtus (W. Wilson).

tubo-ovarian. Fig. 347 shows the size of the uterus in a case of tubo-abdominal gestation of seven months' duration, described by Bandl. The vagina, cervix and mammæ undergo the changes of pregnancy and thus aid in the recognition of the condition.

ETIOLOGY.

The cause must evidently be some mechanical obstruction to the paspase of the ovum through the Fallopian tube. Pelvic peritonitis, producing adhesions, will constrict the lumen of the tube (Hecker). Bandl

explains the relatively greater frequency of extra-uterine gestation in older patients by the fact that catarrh of the tubes (which produces adhesions with obliteration of the lumen) is more frequent in them. Polypi at the

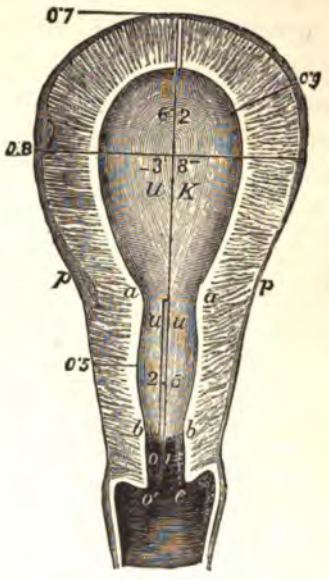


Fig. 347.

Section of a uterus in a tubo-abdominal pregnancy of seven months' duration. *U, K*, body of uterus; *p, p*, fixed point of reflection of peritoneum; *a, a*, os internum of Braune; *b, b*, os internum of Müller; *o e*, os externum. The decidua extended as far as *b, b*, from which Bandl concludes that the part of the cervix *u, u* is taken up into the body of the uterus during pregnancy. The numbers indicate the thickness (in cm.) of the walls and the size of the cavity (Bandl).

entrance to the tube or in the tube itself have been found as the cause of obstruction.

SYMPTOMS AND DIAGNOSIS.

These, briefly described in the order of their development, are the following.

1. *Those of Pregnancy.*—Amenorrhœa, morning sickness, enlargement of the breasts; the patient says that she supposes herself pregnant. As to the amenorrhœa, we must note that it is not continuous; two periods are passed, and then the menstruation may return, or there may be more frequent hemorrhages as in the case to be described; with hemorrhage, portions of decidual membrane may be expelled.

2. *Sudden Onset of Pain, Collapse and Internal Hemorrhage.*—This means that the gestation sac has ruptured. From the greater frequency

of the tubal gestation and the fact that it bursts at an early period—second or third month—with a fatal result, the practitioner often sees the case just at this stage and with these symptoms. He must remember, however, that a hæmatocele due to any other cause will produce the same symptoms and physical signs; the history of supposed pregnancy is presumptive of this condition, but absolute certainty is only gained on post-mortem examination.

3. If the case does not thus terminate, there are *occasional attacks of pain in the pelvis and symptoms of inflammation.* This means that the sac has not ruptured, or has done so only partially; the old limiting adhesions are being stretched or torn, and new ones are forming.

4. After the fourth month, *pressure symptoms* often develop; there is difficulty in micturition (amounting to retention), and in the action of the bowels. This is due to the fact of the sac's having fallen down behind the uterus into the pouch of Douglas and being of such a size as to fill the pelvis; with this, the uterus will also be displaced. The condition is in many points analogous to retroflexion of the gravid uterus. Pressure symptoms are not always present; the sac may be fixed by adhesions which prevent its falling into the pouch of Douglas.

5. Finally, the *physical signs of advanced pregnancy* appear; the fœtal heart is heard; the parts of the child are felt on palpation. This may be prevented by two causes. (1.) The gestation sac may at any period cease to enlarge; suppuration may lead to discharge of the fœtus, or lime salts may be deposited in it producing a lithopædion. (2.) The fœtus may die but the sac with the placenta continue to grow and enlarge. It is evident that the diagnosis of this during life is impossible, as the death and shrivelling up of the fœtus remove the features which distinguish this from other tumours beside the uterus.

Differential Diagnosis.—When the sac ruptures early, differential diagnosis of hæmatocele due to this cause (from that due to any other cause) is impossible without a post-mortem examination. The abdominal pain and vomiting which sometimes accompany rupture of the sac have led to suspicion of *irritant poisoning*, as occurred in the case[1] seen at Fig. 346.

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[1] See Trans. Edin. Obst. Soc., Vol. V., Part III., p. 169, for the history of this case; for the figure we are indebted to Dr. Wilson.

When the sac has not ruptured, it must by careful palpation be differentiated from the following conditions:—

1. Normal gravid uterus,
2. Retroflexed gravid uterus,
3. Simple hæmatocele,
4. Ovarian tumour,
5. Fibroid or fibro-cystic tumour,
6. Extensive pelvic inflammation.

1 and 2. The fact that *the uterus may be felt separate from the tumour* differentiates this from the first two conditions. It is evident, however, that when the gestation is close to the uterus, this separation will not be made out. Also when the uterus is stretched upon the wall of the sac (*v.* Plate IX.), a condition is produced which simulates retroflexion of the gravid uterus. Contractions are not felt in the sac as in the pregnant uterus. Normal intra-uterine has coexisted with extra-uterine gestation.

3. Gradual increase in size and the symptoms of pregnancy distinguish the unruptured sac from hæmatocele; the latter becomes firmer and is then absorbed.

4. The close resemblance between a small ovarian tumour and a tubal gestation demands, when pregnancy is suspected, careful watching of the development of the tumour and examination for ballottement or the souffle and fœtal heart; in some cases puncturing and drawing off a little fluid aid diagnosis, but this must be done with caution (*v.* Treatment).

5. Fibroid tumours are of a firm unyielding consistence and do not grow so rapidly as a gestation sac would. They are of a large size before they become cystic.

6. Pelvic inflammatory deposit has not the same defined outline. We must remember that an abdominal gestation owes the formation of its sac to inflammatory changes.

PROGRESS AND TERMINATION.

More than four-fifths of the cases end fatally; the mortality is 82.5 per cent. (Kiwisch). In 150 cases of tubal gestation, Hennig found that a fatal result followed in 88 per cent. This occurs most frequently at the second, third, or fourth month (Bandl).

A favourable result may be due to operative interference, or to the death of the fœtus and its expulsion piecemeal; more rarely does it shrivel up and, becoming calcified, form a lithopædion.

TREATMENT.

Four methods have been adopted: (1) Tapping the sac and drawing off the liquor amnii; (2) Tapping and injecting morphia or other narcotics; (3) Electricity; (4) Removal of the fœtus by abdominal section or through the roof of the vagina. The first three simply aim at destroying the life of the fœtus, leaving it to become mummified or to be discharged by inflammation and suppuration. Tapping should not be employed unless the nature of the tumour be doubtful, in which case it is necessary for diagnosis; the sudden evacuation of the sac has been followed by contractions, complete rupture and death. Where the diagnosis is certain and the sac situated low down in the pelvis, it may be opened into through the vaginal roof with the thermo-cautery. The fœtus is removed but not the placenta. The advantage of cutting to the sac through the vagina is that it allows us, in the case of hemorrhage, to plug the sac with salicylic silk. The risk here will be that in opening the sac we cut into the placenta. The seat of the placenta might perhaps be ascertained by a preliminary puncture (Fränkel). When the sac is inaccessible from the vagina, laparotomy should be performed; here it is best, if possible, to remove the sac entire as one would an ovarian tumour. If this cannot be done, the fœtus might be removed and the sac stitched to the abdominal walls. In the case of tubal pregnancy, we should operate as soon as the case is diagnosed; in the case of abdominal, we can wait till the full time of pregnancy has been reached (see last paragraph on p. 264). We recommend to the student the chapter on extra-uterine pregnancy in Thomas' work as giving the best resumé of treatment that we know of.

When the fœtus is dead, are we to operate? The preparation (Plate IX.) shows that the placenta may continue to grow and lead to fatal internal hemorrhage; it also shows that after a time removal may be impossible.

CASE OF EXTRA-UTERINE GESTATION, WITH DEATH OF THE FŒTUS BUT CONTINUED GROWTH OF THE PLACENTA, WHICH LED TO FATAL HEMORRHAGE.

"*History.*—A. B., æt. 24, IV-para. Five months ago, passed two periods without menstruating, had morning sickness, thought herself pregnant. Three months ago, began to have irregular hemorrhages thrice a month and in considerable quantity; at the same time began to have

pain in the back and across the abdomen sometimes so severe that she had to sit down, but was never confined to bed. For the last six weeks, has had difficulty in moving the bowels; three weeks ago and on other occasions since, has had retention of urine requiring catheterisation.

"*Clinical Features.*—After drawing off ℥ c. of urine with the catheter, a tumour is found impacted in the pelvis. The vagina is compressed against the pubis, the cervix is beyond reach above the brim, the bladder is displaced into the abdomen. The tumour is of the size of a 4½-months' pregnant uterus but of a firmer consistence, no uterine contractions are felt in it; auscultation reveals neither uterine souffle nor fœtal heart; no uterus can be felt separate from the tumour. Professor Simpson punctured

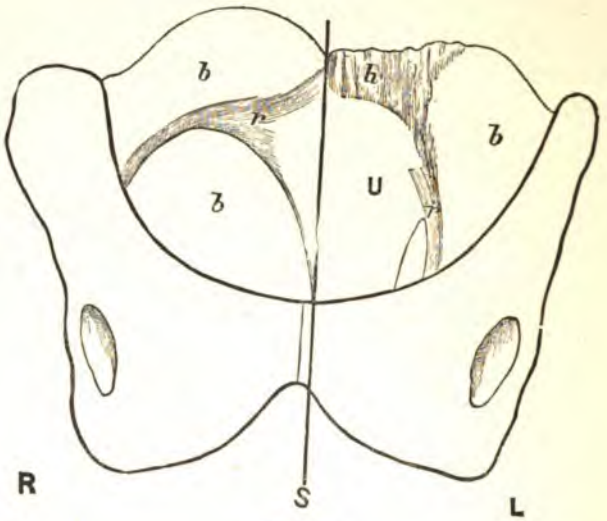


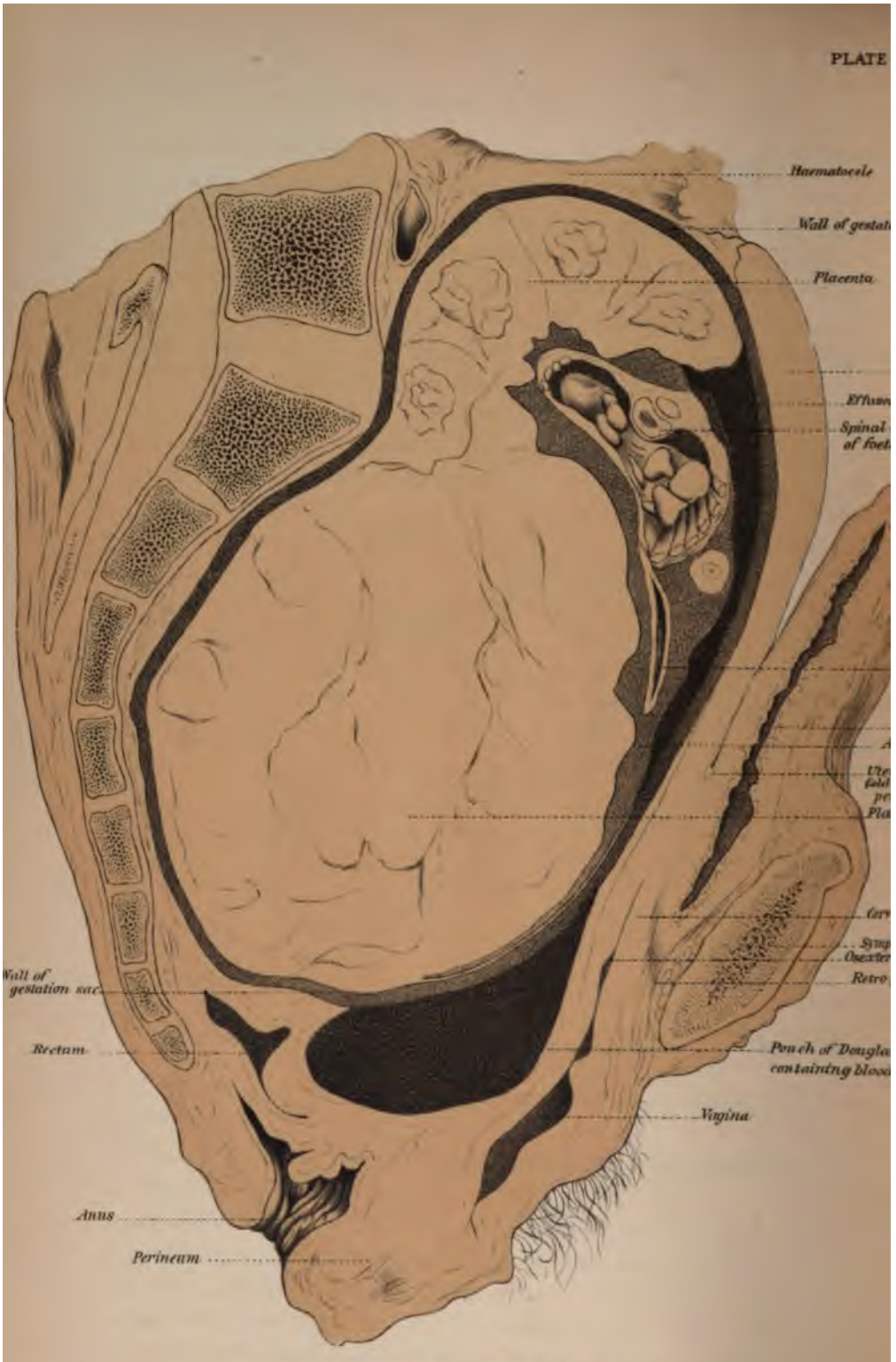
Fig. 348.

Front view of pelvis and tumour, seen in section at Plate IX. *U*, uterus; *b*, *b*, *b*, broad ligaments; *r*, *r*, round ligaments; *h*, adhesions from uterus to omentum which enclosed hæmatocele (Barbour).

the cyst with an aspirator-needle through the posterior fornix; only blood was obtained.

"The patient died with symptoms of internal hemorrhage with increase in size of the pelvic tumour."

Post-mortem Examination.—The uterus is seen to form part of the anterior wall of a tumour which completely fills the pelvis (Fig. 348); on each side is the peritoneum of the anterior surface of the broad ligaments; the round ligaments can be traced as in Fig. 348, the right one passing more directly outwards than the left. The intestines were ad-



EXTRA-UTERINE GESTATION.

herent to its upper surface at the point *h*; on detaching them, a recent hæmatocele was opened into.

The pelvis was frozen and a section made, with a saw, through the line S. An acute tracing of the frozen section was taken on glass, of which Plate IX. is a faithful representation.

Description of Plate IX.—The empty bladder extends to 3 inches above the symphysis pubis. The utero-vesical pouch of peritoneum is almost on a level with the pelvic brim. The uterus is divided through its left wall —the cavity not being cut into; it measures $5\frac{3}{4}$ inches (14.6 cm.) long, the fundus being 5 inches (12.7 cm.) above the symphysis: the cervix is drawn up so that the fornices are obliterated. From the upper border of fundus adhesions passed to the omentum, which enclosed a hæmatocele (Fig. 348, *h*). The gestation sac lies apparently in the pouch of Douglas, the lower part of which contains recently effused blood. The sac is chiefly occupied by the placenta, into which numerous hemorrhages have occurred. The cavity of the amnion can be traced down to the lowest part of the sac, but contains little fluid; it is separated from the anterior wall of the sac by blood effusion. The fœtus has been divided about the level of the diaphragm, so that the thoracic viscera and ribs are visible; an arm is seen in section below the trunk; the head has collapsed and fallen down to one side of the thorax, so that the flat bones are seen (like a compressed shell) in section. The fœtus is about the size of a four-months pregnancy.

This case presents the following points worthy of note. The patient was young and had had a series of normal pregnancies immediately before this one; after two months' amenorrhœa, irregular hemorrhages occurred from the uterus; there was no history of rupture of the sac; fœtal movements had never been felt and the auscultation gave negative results; pressure symptoms appeared at the fourth month as in retroflexion of the gravid uterus; the uterus was taken up, as it were, into the wall of the sac so that the latter simulated an enlarged uterus; the continued growth of the placenta, after the fœtus had died, led to the fatal hemorrhage. Removal of the sac by abdominal section was impossible.

To contrast with this preparation, we have represented at Fig. 349 one from Bandl. The pregnancy had gone on for seven months; fœtal movements and heart sounds were made out. The anatomical relations are

given in the figure. The sac was incised through the posterior fornix, and the child extracted by the feet; the placenta was removed immediately

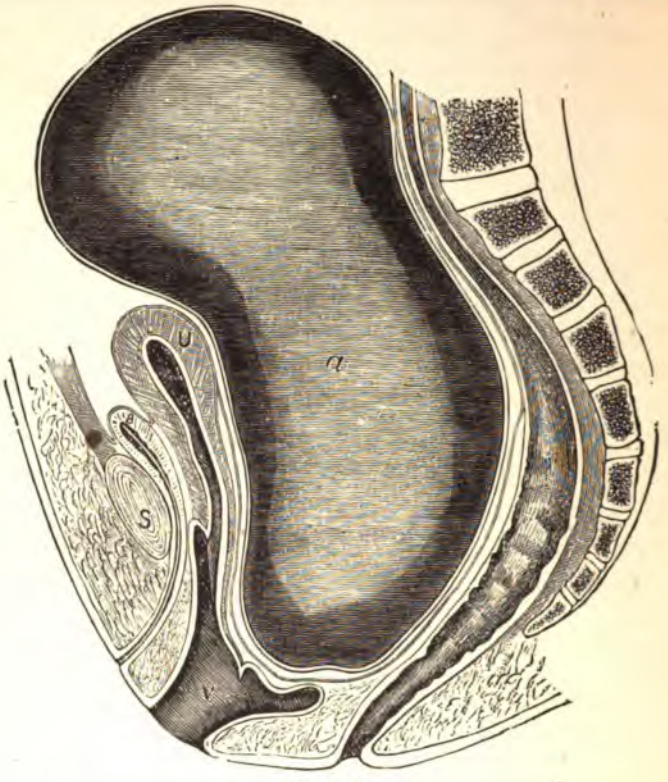


Fig. 349.

Diagrammatic representation of an extra uterine pregnancy of seven months' duration (Bandl). *B*, bladder; *U*, uterus (anterior wall measured 12 cm. long; posterior 16 cm.; thickness at side-walls was 2 cm.); anterior lip is at level of middle of symphysis, S, posterior lip is at level of urethral orifice; gestation sac, which reached to the umbilicus.

afterwards with profuse hemorrhage; the cavity was washed out and a drainage-tube inserted.

SECTION X.

AFFECTIONS OF BLADDER AND RECTUM.

CHAPTER LI. The Bladder: Anatomy, Physiology, and Methods of Examination.

" LII. Affections of the Bladder and Urethra.

" LIII. Vesico-Vaginal Fistula.

" LIV. The Rectum.

CHAPTER LI.

THE BLADDER: ANATOMY, PHYSIOLOGY AND METHODS OF EXAMINATION.

LITERATURE.

Chiene -Bladder Drainage: Ed. Med. Jour., 1880. *Croom, J. H.*—On Retention of Urine in the Female: Ed. Med. Jour., April and May, 1878. *Hart*—Physics of Rectum and Bladder: Ed. Obst. Trans., 1882. *Noeggerath*—Op. cit. *Ogston*—Ed. Med. Jour., 1878. *Power*—Physiology of Micturition: The Practitioner, 1875. *Skene*—Diseases of the Bladder and Urethra in Women: W. Wood & Co., New York, 1878. *Winckel*—Die Krankheiten der weiblichen Harnröhre und Blase: Billroth's Handbuch: Stuttgart, 1877.

Diseases of the bladder are of the greatest importance, as they are not only very painful, but, for a reason to be given shortly, very intractable. In a manual of the present scope, a full consideration of vesical disease is impossible; we therefore give a mere sketch, and refer the practitioner for details to Skene's or to Winckel's manual.

ANATOMY AND PHYSIOLOGY.

For the anatomy, the student is referred to Vol. I., pp. 28 to 34. We should here only point out that the female bladder, owing to its greater breadth transversely at the base (*v.* Fig. 360), is relatively more capacious than that of the male.

Urination.—The mechanism of the storage and expulsion of urine from the bladder is full of interest, both from a theoretical and a practical point of view. The urine trickles along the ureters, a result partly due to blood pressure and partly to the peristaltic action of the ureters themselves. It thus reaches the bladder, at this stage an empty flaccid sac with its upper half fitting into the lower calyx-like portion. Gradually the bladder distends, until at last the activity of the motor centre (whose constant action keeps the urethral muscles contracted) is reflexly inhibited, and the

urine is expelled by the muscular contraction of the bladder and intra-abdominal pressure. The bladder is now contracted, and, on section, has the shape seen at Fig. 350—its shape in systole. The bladder then relaxes, *i.e.*, becomes flaccid or has its diastole, and once more the urine trickles into it (Fig. 27, Vol. I.).

The bladder therefore has, like the heart, its systole and diastole. A knowledge of this is important practically. It explains the intractability

Fig. 350.
Bladder in systole (Braune).

of inflammatory conditions of the bladder, since the bladder when inflamed does not get—what every inflamed organ requires—rest.

The average amounts of the several urinary constituents passed in 24 hours, as given by Parkes, are the following:

	Grammes.
Water,	1500.000
Total solids,	72.
Urea,	33.180
Uric acid,	.555
Hippuric acid,	.400
Kreatinin,	.910
Pigment, etc.,	10.00
Sulphuric acid,	2.012
Phosphoric acid,	3.164
Chlorine,	7.00
Ammonia,	.770

	Grammes.
Potassium,	2.500
Sodium,	11.090
Calcium,	.260
Magnesium,	.207

Urine also contains various epithelial scales, a little mucus, nitrogen and carbonic acid gases.

The reaction is acid, and the specific gravity is 10–20.

METHODS OF EXPLORING THE URETHRA AND BLADDER.

a. *By Catheter and Sound.*

The catheter is passed for the purpose of drawing off the urine, while the sound is usually employed for diagnostic purposes—ascertaining the state of the mucous membrane, the presence of stone or other pathological conditions.

Method of Passing the Catheter.—The instrument to be employed for this purpose is a male gum-elastic catheter, No. 8 or 10. In some special cases, a silver instrument is required. Battey recommends a long rubber catheter as a very useful instrument. The catheter must first be thoroughly washed with carbolic lotion 1–20, and then its end dipped in 1–40 carbolic oil. Cleanliness in the use of the catheter is of the very highest importance, as cystitis and even pyæmia may be caused by putrid urine in old people.

The patient lies on the left side square across the couch, with the hips at the edge and the knees drawn up. The pulp of the index finger of the left hand is passed over the base of the perineal body and onwards until it touches the vestibule. It should then be carried a little backwards until we feel the meatus at the base of the smooth vestibule and in the middle line. The catheter is passed with the right hand; the index of the left hand feels, through the anterior vaginal wall, that it passes into the urethra. After the last drop of urine has been expelled, it is withdrawn and the finger held over its proximal end so as to retain the fluid remaining in the catheter until it can be poured into the receptacle.

The catheter may also be passed with the patient lying on the back; the index of the right hand is carried under the drawn-up right thigh to feel the meatus, and the catheter is passed between the thighs with the left.

Battey's catheter is very convenient, as from its length it reaches to

urine is expelled by the muscular contraction of the
dominal pressure. The bladder is now contracted,
the shape seen at Fig. 350—its shape in systole.
laxes, *i.e.*, becomes flaccid or has its diastole, and
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The average amounts of the several urinary constituents
hours, as given by Parkes, are the following:

	Gra
Water,	1500
Total solids,	72
Urea,	33.1
Uric acid,	.6
Hippuric acid,	.7
Kreatinin,	.9
Pigment, etc.,	10.0
Sulphuric acid,	
Phosphoric acid,	
Chlorine,	
Ammonia,	

as a means of treatment. The object is to dilate the urethra sufficiently to allow of the passage of calculi, crushed or uncrushed. By it we also

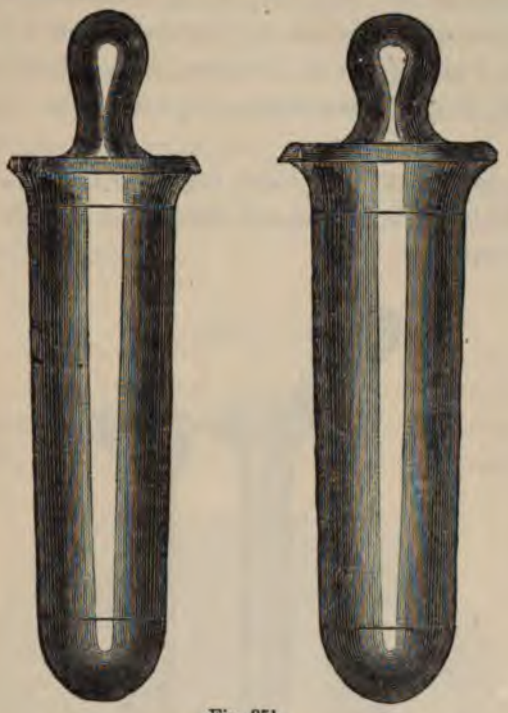

Fig. 351.

Simon's urethral specula (Winckel).

destroy temporarily the sphincteric action of the urethra and thus establish an incontinence of urine ; this allows to the inflamed mucous membrane, undisturbed now by the frequent muscular contractions which before were necessary to expel the urine, the rest it needs. The difficulty of Simon's method is the risk of causing, by over-stretching, permanent incontinence of urine—a condition as yet incurable.

Fig. 352.

The various sizes of Simon's specula (Winckel).

Simon's specula are shown at Fig. 351, and the various sizes at Fig. 352. The specula are provided with bulbous plugs, to be used while they

are being introduced and afterwards withdrawn. Simon estimated the limit of safe dilatability for the female urethra at various ages as follows:—*Adults*, 6–6.25 cm. ($2\frac{6}{16}$ – $2\frac{7}{16}$ in.) in circumference, or 1.9–2 cm. ($\frac{3}{4}$ in.) in diameter; *Young women* (of 15–20 years), 5.6–6.3 cm. in circumference, or 1.8–2 cm. ($\frac{3}{4}$ in.) in diameter; *Girls* (of 11–15 years), 4.7–5.6 cm. ($1\frac{7}{8}$–$2\frac{1}{8}$ in.) in circumference, or 1.5–1.8 cm. ($\frac{9}{16}$ – $\frac{11}{16}$ in.) in diameter.

Practically, we find that the index finger can be passed with safety; and that any dilatation beyond an inch diameter is dangerous in regard to permanent incontinence.

Fig. 353.

Skene's urethral specula (Skene).

Persistent incontinence has attended the extraction of stones with a diameter of $1\frac{3}{8}$ in., but Dunlap has recorded a case where a stone $2\frac{1}{8}$ in. in diameter was safely extracted uncrushed through the urethra without consequent incontinence of urine (*Am. J. of Obst.*, Vol. XIV., p. 855).

The dilators of Simon are graduated, and are passed slowly until the desired limit is reached.

It is doubtful if they can, without risk, be used as Simon recommends.

Specular Examination by Skene's Specula.—Fig. 353 shows Skene's specula. Each may be described as a small test tube which fits into a truncated or fenestrated case of vulcanite. The glass tube projects beyond

the outer truncated case ; and a small mirror can be carried through the inner tube so as to reflect light.

Skene's directions are to pass the tube (with mirror inside) along the urethra, and to use sun-light or gas-light from a moveable bracket. When a large Skene's speculum is used, the urethra should be first dilated with the index finger. When viewed through the speculum, the mucous membrane of the bladder is somewhat pale.

The hard rubber speculum can be used to make applications.

A specially narrow Fergusson's speculum with a hand mirror is also simple and useful (M. Duncan).

c. *Catheterisation of the Ureter.*

This is by no means an easy operation, but is useful in certain cases.

By this means we can ascertain the position of the ureter in operating on vesico-vaginal fistula, and prior to incision of the cancerous uterus;

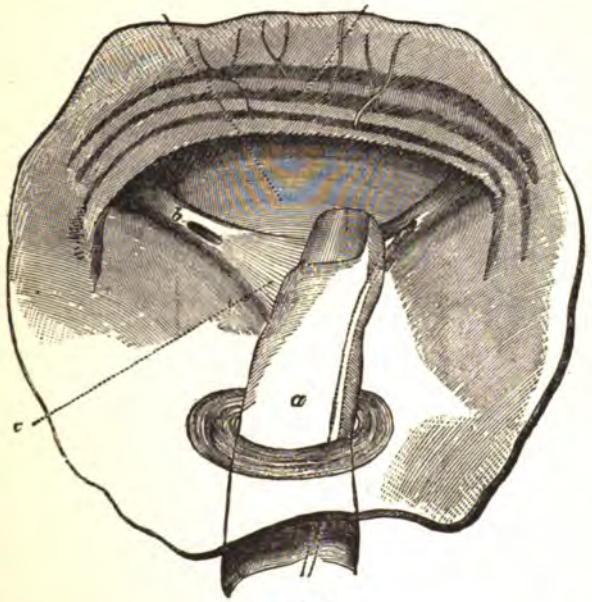

Fig. 354.

Finger passed through urethra into bladder to guide hollow probe into left ureter. *a*, internal sphincter of urethra; *b*, orifice of right ureter; *c*, interureteric ligament (Winckel).

and, in proposed excision of the kidney, can ascertain the state of the other kidney by examination of the urine from it.

Method of Performance.—Pass the index finger into the bladder as

already described (p. 278) ; about an inch from the neck of the bladder and at each end of the inter-ureteric ligament, a prominence (in which is the vesical opening of the ureter) can be felt with the pulp of the examining finger. A fine hollow probe is guided into this and its point carried to the side (Fig. 354). The urine will now trickle out drop by drop. According to Pawlik, the interureteric ligament can be felt through the anterior vaginal wall when the patient is in the genupectoral posture. He thus passes the ureteric catheter without dilating the urethra (Centr. f. Gyn., Oct. 15, 1881).

CHAPTER LII.

AFFECTIONS OF THE BLADDER AND URETHRA.

For Literature, see Chapter LI.

MALFORMATIONS OF THE BLADDER AND URETHRA.

These comparatively rare malformations are easily understood on consideration of the development of the organ.

The bladder is the part of the allantois included by the abdominal plates of the embryo (Figs. 311 to 315); the upper portion of the posterior wall of the urethra is formed by Müller's ducts, while the lower is formed by an invagination from the genito-urinary sinus. The developmental defects are therefore the following :—

(1) Total absence of urethra ;
(2) Defect of external portion of urethra—hypospadias ;
(3) Defect of internal portion of urethra ;
(4) Atresia of the urethra (in malformed fœtuses) ;
(5) Extroversion of the bladder from deficient closure of the embryonic abdominal plates.

We would here only note the rarity of these conditions, and refer the practitioner to Skene or Winckel for details.

DISEASES OF THE URETHRA.

Of these the most important are Displacements, Neoplasms, Urethritis, Dilatation, and Stricture.

Displacements of the urethra will be easily understood by reference to those of the bladder.

Neoplasms of the Urethra ; Urethral Caruncle.

The urethra is liable to be invaded by papillomata, polypi, sarcomata, carcinomata, and vascular growths (angiomata).

Of these last, the most common is the well-known Urethral Caruncle.

Pathology.—This is a vascular excrescence varying in size from a pin head to a strawberry; it consists of dilated capillaries in connective tissue, the whole being covered with squamous epithelium. *Physical signs:* A cherry-red tumour, exquisitely tender and vascular, is seen at the urethral orifice (Fig. 355). *Symptoms:* These are pain on micturition or even retention of urine, pain on coitus. *Treatment:* Place the patient under chloroform in the lithotomy posture, and destroy the growth by Paquelin's cautery at a dull heat. If bleeding occurs, do not treat it lightly; plug

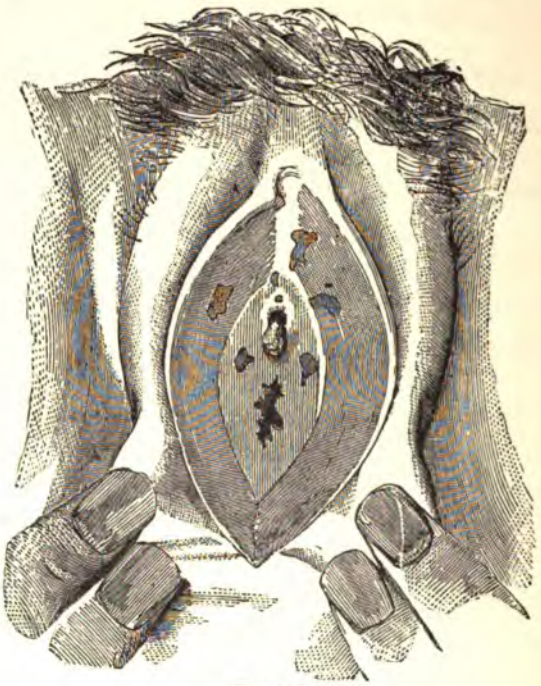

Fig. 355.

Caruncle at urethral orifice (*a*) and, in addition, neuromata in surrounding mucous membrane. See p. 220. (Sir J. Y. Simpson).

the vagina, bringing the half of the last strips of lint over the urethral orifice and fixing with a perineal band.

As regards the other neoplasms, papillomata are painless, sarcomata very rare and their nature settled microscopically, while carcinomata appear as hard peri-urethral tubercles which break down (Skene). In regard to treatment, they may be removed by the curette, or by small loop-snares when high up. We may also have inflammatory changes in Skene's "tubules" (*v.* Vol. I., p. 30).

Urethritis.

Acute urethritis is usually part of a gonorrhœa. When pus is secreted, the urethra can be felt swollen and tender; the pus can be squeezed out of the urethral orifice by pressure from above downwards; on passage of the catheter, pain is felt in the urethra although no cystitis be found.

Treatment.—Give diluent drinks so as to increase the flow of urine. Copaiba may be given in the form of the well-known Nesbitt's specific:—

℞. Liquoris Copaibæ Co. (Nesbitt)..... ℥ ij.

Sig.—Teaspoonful thrice daily.

Iodoform bougies may be passed in, and counter-irritation applied in the shape of the tincture of iodine over the anterior vaginal wall.

Dilatation and Stricture of the Urethra.

The urethra may be unusually *dilated*, a condition rarely met with; in some cases the dilatation has been caused by coitus, as in malformations of the vagina (*v.* Vol. I., p. 248). The dilatation may be local or general. When it is general, the cautery may be used to burn a vertical furrow, the rest of the urethra being guarded by a speculum.

Stricture of the urethra is a rare condition and readily yields to dilatation by bougies or to incision.

DISEASES OF THE BLADDER.

Of the diseases of the bladder we shall here consider Displacements, Neoplasms, Stone in the Bladder, and Cystitis. Vesico-vaginal fistula will be considered in a separate chapter (Chap. LIII.).

DISPLACEMENTS OF THE BLADDER.

The female bladder when empty lies between the pubis and usually to one or other side. It is never exactly central.

From its loose attachment to the pubis, it is pre-eminently displaceable. (1) It is drawn up during labour; and (2) is displaced upwards by retroversion of the gravid uterus, pelvic ovarian or fibroid tnmours, and pelvic hæmatocele. (3) It may be adherent to the anterior surface of an abdominal ovarian or fibroid tumour, and may thus be cut into on abdominal section. (4) It is displaced downwards in prolapsus uteri, cysto-

cele, and in the so-called elongation of the supra-vaginal portion of the cervix. (5) In pathological anteflexion of the uterus, the bladder is drawn back and fixed; its systole is thus interfered with, which explains some cases of so-called hysterical retention of urine.

From this mobility it follows that the height of its fundus above the symphysis gives no indication of the amount of urine in the bladder.

Cystocele.

By this we understand a pouching of the posterior wall of the bladder downwards and backwards; the uterus and summit of the bladder are in normal position.

Many a case, regarded as cystocele, is really part of a prolapsus uteri; on the other hand, the so-called "senile prolapsus uteri" is really a cystocele; at the menopause the cicatrisation of the vaginal walls chiefly affects the posterior one, and thus the bladder tends to bulge outwards at the vaginal orifice.

The diagnosis is easily made by the bimanual and use of the sound. The treatment consists in the use of a ring pessary with diaphragm (Fig. 328) or such a one as is seen at Fig. 331. Should these fail, the vagina may be packed with oakum, or a raw surface (as shown at Fig. 339) may be made and stitches applied.

NEOPLASMS OF THE BLADDER.

Pathological Anatomy.—We may have mucous, fibroid or fibro-myomatous polypi. There may also be sarcomatous or carcinomatous disease of the bladder wall, as well as so-called tubercle. The carcinomatous condition is not unfrequent, and is termed by some "villous cancer." It is most common at the trigone, and is held by some authorities not to be malignant. The bladder may be secondarily affected in carcinoma uteri (*v.* p. 136).

Symptoms.—These are disturbance of micturition, with bloody and phosphatic urine.

Physical Signs.—The passage of the index finger into the bladder will show the position, shape, and other characters of the growth.

Treatment.—This will vary according to the position, nature, and pediculation or non-pediculation of the growth. Thus it may be twisted off by narrow polypus forceps, snared by a loop of fine catgut, or removed by

incision into the posterior wall of the bladder and use of the galvano-cautery or curette (*v.* Stone).

Cystitis.

Nature.—An acute or chronic inflammatory affection of the mucous membrane of the bladder.

Pathological Anatomy.—In the acute catarrhal form, we have congestion of the vessels and loss of epithelium; in the chronic catarrhal form, the congestion is duller and there is marked rugosity of the lining of the bladder. The submucous and even the muscular tissues also become affected. The mucous membrane may be ulcerated and the muscular tissue exposed.

The inflammatory process may extend deeper, to the muscular tissue (interstitial cystitis) or to the peritoneum (pericystitis). Occasionally, though rarely, we may have diphtheritic inflammation.

In advanced cases, the patient is usually septicæmic and there is often hydro-nephrosis. In some cases of prolonged retention the mucous membrane may slough off and be passed per urethram, but may be regenerated.

Etiology.—The causes are as follows: Gonorrhœa; latent gonorrhœa; exposure to cold; injury from coitus; prolonged parturition; introduction of septic matter by catheter or bougie; prolonged retention of urine.

Symptoms.—In *acute cystitis* the patient has very frequent and painful micturition. In *chronc cystitis*, also, there is frequent micturition but accompanied with less intense pain; there are, further, shooting pains with secondary phenomena—septic, vascular and nervous.

Physical Signs.—(*a*) *Acute Cystitis:* The urine has a low specific gravity, an acid reaction; the colour is little altered, and mucus is present in excess. On vaginal examination, pain is not felt when pressure is made on the posterior vaginal wall but is felt severely *when the anterior wall is touched.*

(*b*) *Chronic Cystitis:* The urine has a low specific gravity, is usually alkaline, and is often offensive; it contains pus, epithelium, phosphates and bacteria; albumen, derived from the pus, is present. The vaginal examination gives the same results as in acute cystitis. If the finger be passed through the urethra (*v.* p. 278), the roughened condition of the lining membrane is felt; crystals of phosphate and marked rugosities can also be detected.

Prognosis.—In both acute and chronic cystitis, the prognosis is not good; the treatment is difficult, and in bad chronic cases the patient's strength sometimes becomes exhausted and septicæmia may cause death.

Treatment.—(*a*) *Acute Cystitis:* Put patient on milk diet, and give Friedrichshall or Carlsbad water freely. Diluent drinks may be taken *ad libitum.*

The following prescription is useful.

℞. Potassæ Bicarbonatis..... ʒ iss.
Tincturæ Hyoscyami..... ʒ j.
Infusum Buchu,
vel Pareiræ,
vel Uvæ Ursi } .....ad ℥ vj.

Sig.—Tablespoonful thrice daily.

In gonorrhœal cystitis, the following may be substituted.

℞. Liquoris Copaibæ Co. (Nesbitt)..... ʒ ij.

Sig.—Teaspoonful thrice daily.

If the pain is very acute give morphia suppositories (¼ grain) at night, omitting the mixture with the hyoscyamus if necessary.

For (*b*) *chronic cystitis* we recommend the following treatment *seriatim.*

1. Put on milk diet with abundant fluids, and purge freely. Give

℞. Acidi Nitrici diluti..... ʒ iij.
Tincturæ Hyoscyami..... ʒ j.
Infusum Buchu .....ad ℥ vj.

Sig.—Tablespoonful thrice daily.

The hyoscyamus eases the pain; and the nitric acid corrects the alkaline phosphatic urine, for which also benzoate of ammonia is admirable.

℞. Ammoniæ Benzoatis..... ʒ iij.
Aquæ..... ℥ vj.

Sig.—Tablespoonful thrice daily.

The benzoate of ammonia is converted into hippuric acid and corrects alkalinity.

2. If this fail, then wash out bladder as often as possible by means of double catheter, such as Skene's; use weak boracic lotion, or carbolic

lotion; inject with the douche or Higginson's syringe. Paint anterior vaginal wall with tincture of iodine.

3. A long (winged) india-rubber catheter may be kept in the bladder so as to drain off the urine constantly and give the bladder rest. The patient need not remain in bed if the Skene-Goodman catheter (Fig. 356) is used.

4. In obstinate cases, the formation of an artificial vesico-vaginal fistula may be tried. To do this, chloroform the patient; place her in the lithotomy posture and apply Sims' speculum. Open into the bladder through the anterior vaginal wall, in the middle line, with Paquelin's cautery at a dull heat. This may also be done with the scissors, as follows: pass the finger into the bladder, and then by means of a pair of straight scissors cut it open in the middle line. Preliminary dilatation of the urethra with the finger enables the operator with certainty to avoid cutting into it. The advantage of the cautery is that the wound does not readily

Fig. 356.

The Skene-Goodman self-retaining catheter; an india-rubber bag can be worn with it (Skene).

unite; when the opening is made with knife or scissors, care is required to prevent its healing.

The urine trickles through the artificial fistula; in this way, the bladder gets complete rest and can be thoroughly washed out.

After some months the fistula is easily closed, as in the operation for vesico-vaginal fistula. Severe cases of cystitis will tax, more than any other disease, the practitioner's patience and knowledge. It is well to keep in mind the reason of this intractability, *viz.*, the inability of the bladder to remain at rest.

As can be seen from what has gone before, the principles of treatment are the following: (1) to correct abnormalities in the urine; (2) to allay the irritability of the bladder; (3) to lessen the congestion of the bladder by purgatives and counter-irritants, and to render the urine bland and lessen the work of the kidney by milk diet; (4) to allay the irritable condition of the bladder by injection; (5) to give it complete rest by a permanent cathether or, in extreme cases, by an artificial fistula.

CALCULI AND OTHER FOREIGN BODIES IN THE BLADDER.

The female bladder is liable to receive foreign bodies from three sources.

A. Calculi from the kidneys—uric acid, oxalates, phosphates, or cystine.

B. Substances from neighboring organs—pus from pelvic abscess, concretions from the intestines, bones from an extra-uterine fœtation, pessaries from the vagina, echinococci and other parasites, such as those associated with chyluria.

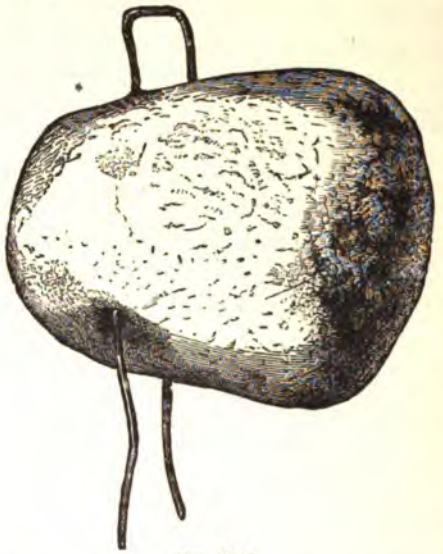

Fig. 356*.

Large stone, which formed round a hair-pin as nucleus, extracted by vaginal lithotomy (Angus Macdonald).

C. Foreign bodies introduced wilfully into the bladder by patients of depraved taste; these often form nuclei for stones (Fig. 356*).

Of these, *calculi* are the most important. Stone is less common in the female than in the male, as small calculi can pass along the dilatable female urethra; occasionally, therefore, the gynecologist has to remove from the urethra small stones impacted there—usually at the meatus urinarius. The introduction of foreign bodies, which act as nuclei, is more common in the female.

Symptoms.—These are severe pain in micturition, especially at the close; alterations in character of urine; blood in urine.

Physical Signs.—The stone, when at all large, can be easily detected

bimanually; when any doubt exists, the use of the sound or the passage of the finger into the bladder renders the diagnosis easy.

Treatment.—Measure the stone: if it be less than an inch, it may be extracted through the urethra dilated first by the finger or Simon's specula; if greater than an inch, then dilate the urethra and crush; if very large or hard or if it have a nucleus, extract by vaginal incision. This incision may be stitched up after the operation, or kept open when the bladder has been much irritated; it can afterwards be stitched as in vesico-vaginal fistula.

For other foreign bodies, the urethra can be dilated and the substance grasped by polypus forceps or manipulated out. When large, they may be extracted as in the case of large stones.

FUNCTIONAL DISEASES OF BLADDER.

By these we understand derangements of the bladder in regard to urination. Either these are due to causes as yet unascertained, or the same derangement (*e.g.*, retention) is associated with many lesions.

The chief functional diseases are these—

Irritability,
Incontinence,
Retention.

In regard to all of them, we may remark that in no case should the diagnosis of a functional disease of the bladder be made until the practitioner is satisfied that there is no organic lesion.

Irritability.—In this, frequent micturition associated with disagreeable feeling is present. It may be due to excessive acidity of the urine but is often a nervous affection. When it is due to excessive acidity, give lithia or potash.

℞. Lithiæ Carbonatis .....gr. v.
Fiat pulv. .....mitte tales vj.
Sig.—One thrice daily.

Incontinence, or inability to retain urine, is most common in little girls; occasionally we meet with it in adults, as the result of prolonged labour or as a permanent condition from infancy.

In the incontinence of girls, note whether there be any irritability of the genitals (vulvitis) or ascarides. Goltz found that, where section of the

spine in the dog above the lumbar enlargement had produced retention of urine, he could make it urinate by sponging the anus with cold water; a reflex impulse passed from the rectum, inhibiting the activity of the motor centre and causing bladder contraction. In a child, ascarides in the rectum will act in the same way when it is asleep.

Treatment.—Treat the irritating cause—as vulvitis or ascarides. If no irritating cause be detected, then give belladonna.

℞. Tincturæ Belladonnæ ..... ʒ ij.
Sig.—Three drops thrice daily.

In strumous cases, give syrup of the iodide of iron or cod-liver oil.

℞. Syrupi Ferri Iodidi ..... ℥ ij.
Sig.—Thirty drops thrice daily.

Retention of Urine.—Palpation shows a fluctuating mesial tumour rising into the abdomen; the position of the fundus of the bladder gives no indication of the amount of urine, as it may be tilted up by retroversion of the gravid uterus. Remember that a bladder may be distended so as to be as large as a six or eight months' pregnancy, and that constant dribbling away of the urine may be a symptom of retention. Examine the pelvis for an organic lesion.

Retention may be due to one of three great classes of causes:

Hysterical,
Reflex,
Mechanical.

1. *Hysterical.* By this we mean that from perversity or a prurient desire to have the catheter passed, a patient feigns inability to pass urine.

The treatment is to give a hot hip-bath followed by a cold one; if the catheter is needed, get it passed by a nurse of unsympathetic tendencies.

2. *Reflex* causes are the following:

(1) Gonorrhœa;
(2) Urethritis;
(3) Irritable caruncle;
(4) Carcinoma, urethral and vaginal;
(5) Perineal and especially vestibular tears after labour, tears of cervix;
(6) Ligature of internal piles.

The treatment is hot applications in (1), (2), (3), and (5) and (6); and the catheter in (4). Remove the source of irritation when possible.

3. *Mechanical.* These are pressures of fibroids, retroversion of the gravid uterus; ovarian or parovarian tumour (pelvic and retro-uterine).

Where the tumour is impacted in the pelvis, a silver male (No. 10) catheter will pass best. The urethra is compressed, the bladder bulging over the symphysis; accordingly, a rigid instrument whose handle can be carried to the perineum is good.

CHAPTER LIII.

VESICO-VAGINAL FISTULA.

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PATHOLOGICAL ANATOMY AND VARIETIES.

The septum between the urinary and genital tracts may be broken through at various points. According to their situation, we have the following varieties of urinary fistulæ :—

Urethro-vaginal,
Vesico-vaginal,
Vesico-uterine,
Uretero-vaginal,
Uretero-uterine.

The situation of these is sufficiently indicated by their names, and will be easily understood by reference to Fig. 357.

A urethro-vaginal fistula rarely occurs alone, but is sometimes present along with a vesico-vaginal one. It lies in the middle line and is, naturally, of small size.

By far the most frequent are the vesico-vaginal fistulæ. They may occur at any point of the vesico-vaginal septum, which measures in height

(from the internal orifice of the urethra to the vaginal fornix) about 5 cm. and in breadth 4 cm. (Kaltenbach). Their size varies from a pin-point or slit-like hole to a large oval (Fig. 362) or four-cornered (Fig. 384) aper-

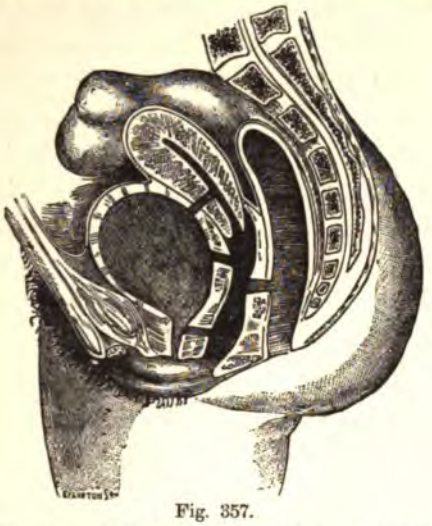

Fig. 357.

To represent the chief varieties of urinary fistula—urethro-vaginal, vesico-vaginal, and vesico-uterine. Those with the ureters are not seen. The seat of a recto-vaginal fistula is indicated (de Sinéty).

ture. When recent they are of larger size, but after some months become contracted through the formation of cicatricial tissue. The *margins* of the *fistula* are at first irregular, swollen, and ulcerated; but after a time they

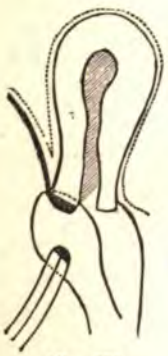

Fig. 358.

Superficial vesico-vaginal fistula. The cervix is intact (Hegar and Kaltenbach).

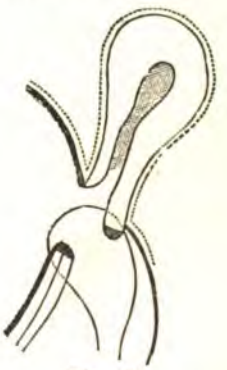

Fig. 359.

Deep vesico-vaginal fistula. The anterior lip of the cervix is destroyed (H. and K.).

become thin and firm, through cicatrisation; these changes have an important bearing on treatment. Jobert divided fistulæ in the anterior fornix into *superficial* and *deep;* in the former (Fig. 358) the anterior lip of

the cervix was not implicated, in the latter it was more or less destroyed (Fig. 359). In cases of fistulæ which allow a free flow of urine, the *bladder* becomes permanently contracted and its walls thickened; in large fistulæ, the mucous membrane protrudes through the opening and is easily recognised from its deep red colour. The normal relation of the openings of the *ureters* to that of the urethra and to the cervix uteri (Fig. 360) renders them liable to be involved in an extensive fistula, or even in a small one lying to one side of the middle line. Sometimes we can recognise their openings on the exposed vesical mucous membrane by means of the urine trickling from the orifices; should the urine be blood-stained, it can be distinguished from blood by its acid reaction to test paper. The *urethra*, through disuse, becomes contracted; sometimes complete atresia

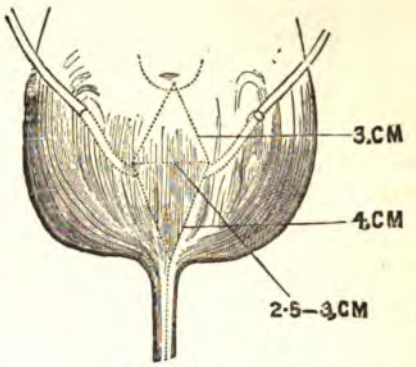

Fig. 360.

The normal relation of the cervix, the ureters, and the urethra (H. and K.). From cervix to orifice of ureters measures 3 cm., from orifice of ureter to that of urethra measures 4 cm., from orifice of one ureter to that of the other measures 2.5 to 3 cm. The ureters run through the bladder wall in an oblique direction downwards and inwards, for from 1.5 to 2 cm.

is present and seriously complicates treatment, and a portion of the canal may even be completely destroyed by pressure (*v.* Fig. 389). The *vagina* is often contracted by cicatricial tissue originating from injuries received during labour. The margins of the fistula are often drawn apart, and sometimes fixed down to the bone, by these cicatrices; this interferes with their closure. Contraction of the vagina below the fistula sometimes makes it impossible to ascertain the condition of the upper part and whether the uterus communicates with the fistulous tract. The relations of the *peritoneum* to fistula are shown in Fig. 361, from which it is evident that only in the repair of very extensive fistulæ would its relations require to be considered. The difficult labour which leads to the production of

the fistula is liable to be followed by puerperal peritonitis or cellulitis; these may disturb the normal relation of the peritoneum.

Vesico-uterine fistulæ are rare. From their position they can be recognised only after dilatation of the cervical canal (*v.* Fig. 388), and it is evident that they must be very small.

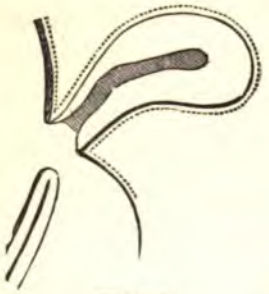

Fig. 361.

Relations of peritoneum, indicated by dotted line, to a fistula which has destroyed the whole of the anterior wall of the cervix and the infra-vaginal part of the posterior wall (H. and K.).

Uretero-vaginal fistulæ are situated in the fornix vaginæ. They are of small size, admitting only the point of the sound, and have either sharp edges or open at the point of a small papilla.

Of uretero-uterine fistula, only nine cases are on record (Kaltenbach).

ETIOLOGY.

Malignant disease is the most common cause of fistula (*v.* p. 136); but we place this form aside, as it is beyond treatment and merely indicates a stage in the progress of the malignant growth.

The most important cases of fistulæ which we have to consider here, arise through *injury received during labour*. This injury may act *directly*, producing laceration of the septum; more frequently it acts *indirectly*, producing necrosis secondary to pressure or inflammation. The causes which predispose to fistula are a narrow pelvis and pendulous abdomen, a firm or large head (hydrocephalus) and face presentations (Winckel). The immediate cause is the compression of the soft parts between the child's head and the bony part of the pelvis; if this pressure continues for a long enough time, it destroys the vitality of the soft parts, which afterwards separate as a slough.

Fistulæ produced by instruments are situated in the lower part of the vagina, and are accompanied with extensive cicatrices and adhesions; those

due to pressure of the fœtal head are placed in the upper part (Winckel). In craniotomy, the soft parts have been sometimes lacerated by the instruments, or by splinters of fœtal bone. Forceps are often cited as a cause of the injury. It is not however *the use* of the forceps after a prolonged labour which is to blame, but the *not using* of them at an early period—before the parts have been destroyed by pressure.

Fistulæ have followed diphtheritic inflammation in the puerperium, but this is rare. Inflammation and ulceration round badly fitting pessaries have also produced them.

SYMPTOMS.

The leading symptom is the *involuntary flow of urine* from the vaginal orifice. *This will not appear until the slough separates*, that is till about the third or fourth day ; its separation may be delayed for three or four weeks, when the necrosis is secondary to puerperal vaginitis (Byford). When a direct laceration has been produced, the urine will flow *at once* per vaginam ; but even here it may escape notice till the second or third day, as it is masked by the lochial discharge.

The power of retaining varies, in certain cases, with the position of the patient ; with a fistula situated high up, the erect posture allows the lower portion of the bladder to be used, though the flow is continuous in the recumbent posture. With a urethro-vaginal fistula, there may be perfect continence from a sphincter-like action of the muscular fibre in the wall of the urethra ; the patient observes, however, that the urine does not pass by the urethral orifice.

Secondary symptoms are due to a constant wetting of all the surrounding parts with the urine. The urinous *odour* is quite characteristic in urinary fistula ; there is *excoriation* round the vulva, the inside of the thigh is red and irritated. *Menstruation* is generally in abeyance, returning after the fistula has been cured. There is usually *sterility ;* although cases of conception, often followed by abortion or premature labour, have been recorded. The disagreeable surroundings interfere with the appetite and digestion ; there is *constipation*, which Freund has ascribed to increased secretion by the kidneys but which is more probably due to reflex contraction of the muscular fibre of the rectum (Winckel). The general health thus becomes seriously impaired, so that the patient is willing to submit to any operation which promises relief.

DIAGNOSIS.

The irritated appearance of the external genitals with the characteristic odour at once indicates that there is fistula, but the diagnosis of its position is often very difficult.

Urethro-vaginal and Vesico-vaginal.—*When large*, these may be felt by the examining finger; on our passing the sound into the bladder the finger touches it through the fistula. The speculum shows their position and extent, and reveals smaller ones which escape detection with the finger; by stretching the folds of the mucous membrane with tenacula, we may detect a fistula concealed by them.

To recognise *small vesico-vaginal* fistulæ and to differentiate them from the *vesico-uterine* and *ureteric*, proceed as follows: pass Sims' speculum, carefully wipe away all mucus from the anterior vaginal wall, clear out the cervical canal with a dressed sound and plug it with a pledget of dry cotton wadding; now pass a catheter, and through it distend the bladder slowly with a coloured fluid, such as milk or permanganate of potash; as the bladder distends, watch carefully the anterior vaginal wall for any oozing of the fluid (Winckel). If there is no oozing, the fistula is not vesico-vaginal. If on withdrawing the plug from the cervix it be found stained with fluid, the fistula is *vesico-uterine*. If neither of these forms be present, the urine must come from a *ureteric* fistula; the rarity of this form should lead us to suppose that the fluid may have been temporarily kept from escaping from the bladder by a valvular action of mucous membrane, and the examination should be repeated after a time. In a case of uretero-uterine fistula, Bérard collected the urine which escaped per vaginam in one vessel and that in the bladder was drawn off per urethram by a catheter into another; the quantities in a given time were found to be equal. His conclusion was that he had obtained the secretions from each kidney separately, so that the fistula was ureteric.

PROGNOSIS.

A natural cure will depend on the recentness of the fistula and its size. Small fistulæ, if kept clean, heal of themselves during the puerperium. Large ones require operative treatment; cure by this means depends partly on the size of the fistula, but more on the condition of its margins —whether they contain much cicatricial tissue, and whether they are bound down.

TREATMENT.

There are two essentials for successful operative treatment: (1) complete exposure of the fistula, so that (2) the edges may be thoroughly pared and carefully adapted with sutures. The great difficulty lies in the inaccessibility of the field of operation, to which the failure of the older operative measures is chiefly to be attributed.

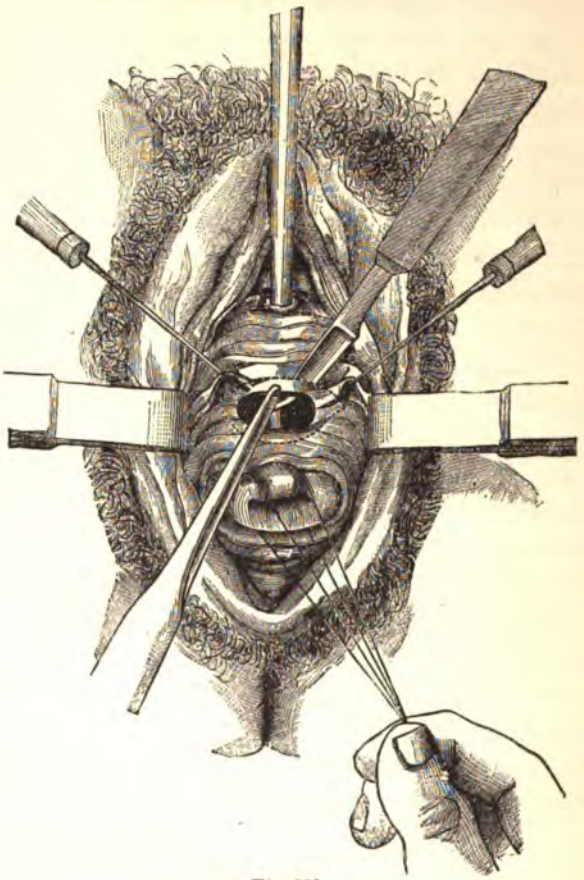

Fig. 362.

Method of paring the edges of a fistula (Simon).

Marion Sims (1849) first rendered successful treatment really possible by the complete exposure of the fistula with his *speculum*, and by the careful adaptation of its margins with *silver-wire sutures*. To Simon of Heidelberg is due the credit of having elaborated the operation, and of having extended its sphere so that almost no form of fistula has in his

hands proved incapable of treatment. We may shortly contrast the methods of these two leading operators as follows: Sims pares the edges

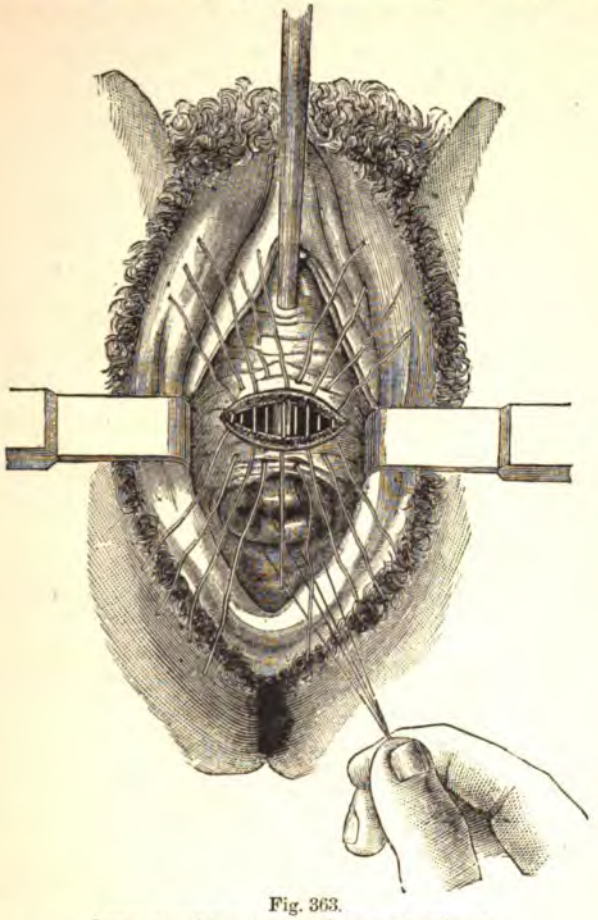

Fig. 363.
Sutures passed in a case of urinary fistula (Simon).

of the fistula in a sloping manner (Fig. 364), carefully avoiding the mucous membrane of the bladder, then adapts the margins of the fistula with

Fig. 364.
The American and German methods of paring the edges of fistulæ contrasted. Sims' is shown on the right margin of the fistula, Simon's on the left. The mucous membrane of the bladder is above, that of the vagina is below. The edges may be pared first according to Sims' method, and if a raw surface is not thus obtained the tissue can be removed up to the fine line (Kaltenbach).

silver wire, and drains the urine continuously per urethram through a catheter; Simon pares away the edges vertically, not specially avoiding the

mucous membrane of the bladder, unites the edges with silk sutures, and encourages the patient to pass water unaided from the first—drawing it off with the catheter only when necessary. Bozeman, a pupil of Sims, has drawn attention to the advantages of the genu-pectoral posture in operating and to the importance of preparatory treatment by dividing and stretching cicatricial contractions; he fixes the sutures with lateral plates and buttons.

When a fistula has been discovered during the puerperium our first aim is to *aid the natural effort at cure.* A catheter (Fig. 390) is placed in the urethra to carry off the urine by the natural passage; the vagina is syringed out occasionally with warm water; the edges of the fistula may be kept together, in some cases, by tampons suitably placed in the vagina.

If the fistula does not close by the natural process, we have recourse to operation.

Operation for Vesico-vaginal Fistula.

There is difference of opinion as to the *time for operating.* According to Hegar and Kaltenbach, the best time is 6 to 8 *weeks* after the confinement; "the lochial discharge has ceased, the necrosis of the tissues is defined, the margins of the fistula are vascular and juicy and are at the same time of sufficient firmness to hold the sutures;" the cicatricial tissue which forms round the margins makes the operation more difficult afterwards. Marion Sims delays the operation for a few months.

Under the operation, we shall describe—

1. Preparatory treatment;
2. The operation, which consists of (*a*) the paring of the edges of the fistula and (*b*) their adaptation with sutures;
3. After-treatment.

1. *Preparatory treatment* is only necessary when there are cicatricial bands drawing the margins of the fistula apart or contracting the field of operation. These must be divided and made to heal over a glass plug, or the vagina must be kept distended with air-bags. Frequent vaginal injections are necessary in all cases, to bring the edges into as good condition as is possible.

2. For *the operation* itself the following instruments are required:

Sims' speculum.

Three or four tenacula,
Blunt-hook,
Vaginal douche for permanent irrigation,
Hot water to check hemorrhage,
Dissecting and artery forceps,
Small bistouries straight or set at an angle—on long handles,
Bozeman's scissors,
Several small sponges and sponge-holders,
Short curved needles and needle-holder,
Curved needles on fixed handles,
Silver wire (cat-gut in reserve),
Wire twister.

Good light is essential and as *complete exposure* of the field of operation as is possible; this last will determine the *position* of the patient,

Fig. 365.

Fig. 366.

Fig. 367.

Knives for paring a fistula. Fig. 365, straight knife; Fig. 366, bent knife, which is shown laterally at Fig. 367 (Sir J. Y. Simpson).

according as Sims' or the lithotomy posture allows us to get more readily at the fistula. The drawing down of the cervix with volsella or sutures (Fig. 362), or the protrusion of the edges of the fistula by a catheter in the bladder, is of use in some cases; where the mucous membrane of the bladder (by prolapsing through the fistula) comes in the way, it can be kept back by the sound in the bladder or a sponge probang pushed through the fistula (Sir J. Y. Simpson).

Fig. 368.
Sponge-holder.

Chloroform is always an advantage, as it gives the operator more freedom in exposing the parts and prevents the patient from moving; the actual pain of the operation does not demand it.

Three *assistants* are essential—one to give chloroform, a second to hold the speculum, a third for the sponges; six are better, as two are required

Fig. 369.
Sir J. Y. Simpson's tubular needle for vesico-vaginal fistula (Sir J. Y. Simpson).

Fig. 370.
Passage of the thread with the tubular needle (Sir J. Y. Simpson).

with the patient in the lithotomy posture and there is one to take charge *of the instruments*. The knives employed are shown at Figs. 365–67.

The sponges should be very small and fitted on holders of which a convenient form is shown at Fig. 368. Fixed *needles* are required when the tissue is dense. Sir J. Y. Simpson introduced the tubular needle seen at Fig. 369, which is sometimes of great service.

(*a*) *The Paring of the Edges of the Fistula.*—To produce union, it is essential to have *a continuous raw* surface all round the margin. To procure this, we hook up with a tenaculum the portion of vaginal mucous membrane to be removed and transfix it with the knife (*v.* Fig. 362 and Fig. 371). The knife should not pass through the mucous membrane of the bladder, unless there be so much cicatricial tissue that a large piece

Fig. 371.
Transfixing with a knife both edges of the fistula at once (Sir J. Y. Simpson).

Fig. 372.
Fistula shown at Figs. 370 and 371 closed with sutures (Sir J. Y. Simpson).

requires to be cut out; the reason for avoiding the vesical mucous membrane is to prevent after-hemorrhage into the bladder. In small fistulæ, we can remove the tissue in a ring and thus ensure a continuous raw surface (Sir J. Y. Simpson); in larger fistulæ, we may have to clip portions away with scissors (*v.* Fig. 109, Vol. I.).

Another method of making a raw surface is to split up the edges so that the vesical mucous membrane is separated from that of the vagina; the advantage of this method is that no tissue is lost.

Hemorrhage is best checked by hot douche; large bleeding points may require twisting or even ligature.

(*b*) *The adaptation of the edges with sutures* must be carefully done. The sutures may be passed on an ordinary curved needle, a fixed needle (which is made to transfix both margins of the fistula and then threaded),

Fig. 373.
Bozeman's fork, used in drawing through the wires to prevent their cutting the vaginal mucous membrane (Sir J. Y. Simpson).

or a hollow needle (Fig. 370). To prevent the sutures from cutting the vaginal mucous membrane as they are drawn through, the fork or pulley (Figs. 373, 374) can be used. The sutures must be pretty close together

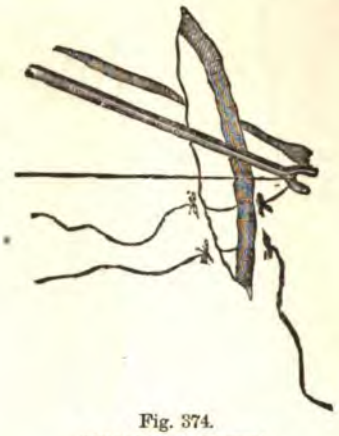

Fig. 374.
Method of use (Emmet).

and should either not pierce the vesical mucous membrane or should take in only its margin. When the tissues are dense, counter-pressure against the point of the needle may be made with a blunt hook as in Fig. 375.

Fig. 375.
Mode of applying counter-pressure to the point of the needle by means of a blunt-hook (Emmet).

Sims passes a silk thread first, and then uses it to draw through the wire suture.

After all the sutures are passed, they are tied (Fig. 377) or twisted (Figs.

376, 380); to bring the wires together we can use Bozeman's suture-adjuster (Fig. 378); the wire-twister (devised by Coghill) is very convenient

Fig. 376.
Sims' method of fixing and twisting the sutures (after Sims).

Fig. 377.
Mode of tying silver-ware sutures (Sir J. Y. Simpson).

for twisting the wires close, especially when the fistula is deeply placed and not very accessible (Fig. 379). Bozeman uses a plate to fix the su-

tures. The fistula seen at Fig. 370 is shown, after the sutures have been twisted up, at Fig. 372. With a triangular fistula the closed wound will

Fig. 378.

Bozeman's suture-adjuster (Sir J. Y. Simpson).

Fig. 379.

Fig. 380.

Coghill's wire-twister, Fig. 379; its point threaded with a wire is shown at Fig. 380 (Sir J. Y. Simpson).

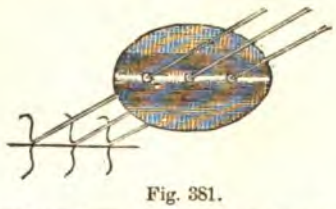

Fig. 381.

Fig. 382.

Wires drawn through Bozeman's plate, Fig. 381; fixed with shot as in Fig. 382 (Sir J. Y. Simpson).

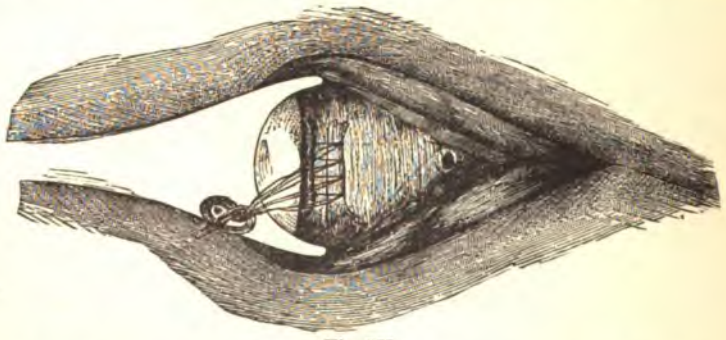

Fig. 383.

Speculum passed for removal of sutures; the patient is on her side (Sir J. Y. Simpson).

be Y-shaped, while a quadrilated fistula will give an I-shaped wound (Figs. 384, 385).

In the case of fistulæ situated close to the cervix, we make use of the

anterior lip to close the fistula; the result is a crescentic wound (Fig. 386). Sometimes we have to excise a position of the cervix to get a sufficient raw

Fig. 384.

Fig. 385.

Four-cornered fistula, Fig. 384, closed by sutures in Fig. 385 (Hegar and Kaltenbach).

surface (Fig. 387). When much of the anterior lip is destroyed, it may be necessary to use the posterior lip to close the fistula (see Fig. 359, and compare it with Fig. 358); in this case the uterus will communicate with

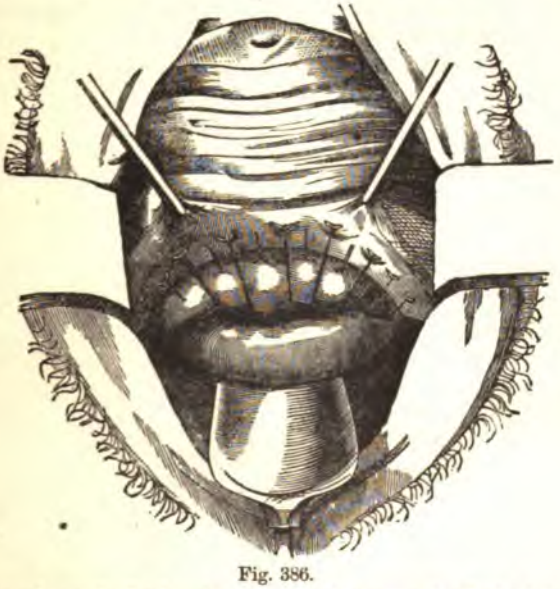

Fig. 386.

Sutures passed through anterior lip of cervix so as to close in transversely a fistula of the anterior fornix (H. and K.).

the bladder and the menstrual blood be discharged per urethram. With vesico-uterine fistula, two courses are open. If possible, we expose the

fistula by splitting the cervix bilaterally and treat it as vesico-vaginal fistula: when this cannot be done, we pare the edges of the os and stitch

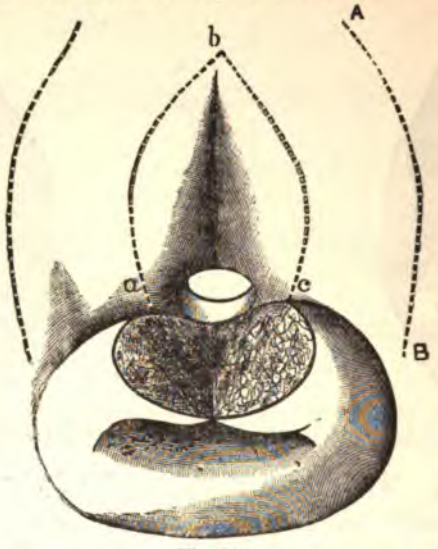

Fig. 387.

Anterior lip divided to close in vertically a fistula close to it. *a b c* shows extent of surface, round the oval fistulous opening, to be made raw; the mucous membrane may have to be incised outside the sutures, along the line *A B*, to relieve tension (Emmet).

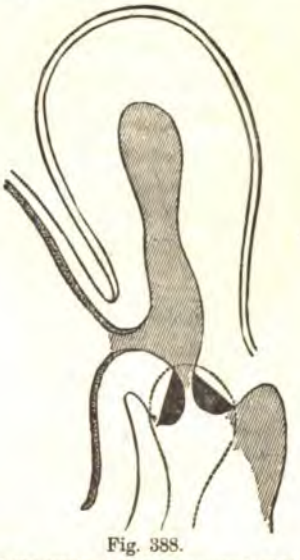

Fig. 388.

Vesico-uterine fistula. The lips of the cervix are pared, preparatory to stitching up the cervical canal (H. and K.).

up the cervical canal; we thus make the uterus open into the bladder (Fig. 388):

When there is a *urethral* as well as a vesical fistula, the *former must be closed first:* when there is *atresia* of the urethra, the free margins of the urethral wall above and below are pared and united by sutures so as to bridge over the atresic portion (Fig. 389); the vesical fistula is obliterated by a second operation.

3. *After-treatment.*—A stationary catheter is placed in the bladder.

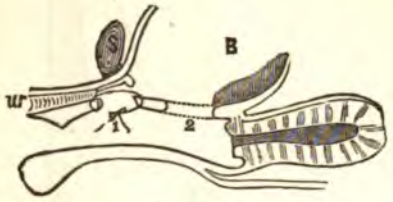

Fig. 389.

Vesical fistula + atresia of a portion of the urethra, *ur*, just below the symphysis, *s*. The latter is first bridged over at 1 and then the vesical fistula closed in at 2 (Winckel).

The form in Fig. 390 is the one generally used, the urine being made to drip into a long narrow vessel (as a soap-dish) passed between the patient's thighs; two catheters are required, so that they may be changed every day as the salts of the urine readily occlude the tube; the one not in use should be thoroughly washed.

The after-dangers of the operations are hemorrhage into the bladder and vesical catarrh. The former is a troublesome complication, as the blood-clots collect in the bladder; when there is marked hemorrhage dis-

Fig. 390.

Fig. 391.

Sims' stationary catheter: Fig. 390, first model; Fig. 391, newest model. That in Fig. 390 is made of block tin so that it can be bent to any curve; when *in situ*, it must be bent so that the external end has its groove uppermost: that in Fig. 391 is of rubber and has tubing attached to it.

tending the bladder, the fistula must be opened up again. Sometimes the ureter has been caught in a stitch and compressed; intense pain, shooting from the kidney downwards along the course of the ureter, with vomiting and other symptoms of uræmia followed but passed off on relaxing the sutures.

The sutures are removed on the 10th day; if the fistula has not united,

they may be left till the 14th day. The method of removing sutures is shown at Figs. 383 and 392.

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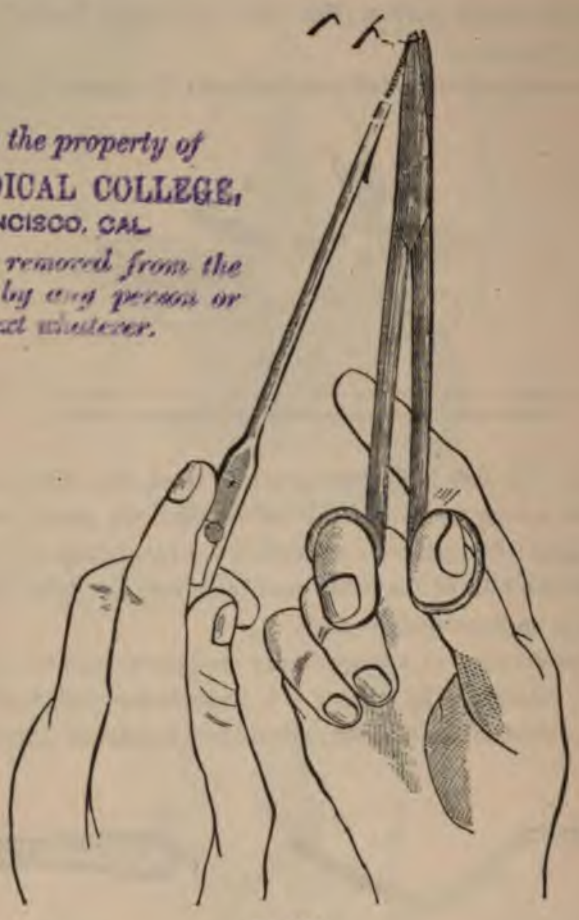

Fig. 392.

Method of removal of sutures (after Sims).

Obliteration of Fistulæ by Cauterisation.

This treatment is only applicable to very small fistulæ. Cauterisation may be done with nitrate of silver or the red-hot wire. Where the fistula is of any size, cauterisation not only fails to close it but converts its margins into cicatricial tissue; this makes its subsequent closure with sutures more difficult. This method of treatment, even in the case of larger fis-

tulæ, has been recently revived and advocated by Bouqué,[1] whose writings may be consulted.

Closure of the Vagina: Kolpokleisis.

Where direct closure of the fistula is impossible, the only means for relieving the patient's discomfort is closure of the vagina below the fistulous opening. The portion of the vagina above this becomes, as it were, an extension of the bladder; the menstrual blood is discharged with the urine.

Vidal de Cassis, who originated this operation, performed it as follows. The inner surfaces of the labia majora were pared and brought together by sutures: the vagina was thus closed in an *antero-posterior* direction. After this operation, there always remained just below the urethral orifice a small cleft through which the urine trickled. Unless complete continence is obtained, such an operation is useless.

Kolpokleisis is the name given to the operation introduced by Simon. It consists in obliteration of the vagina *transversely* by making a raw surface on its walls above the level of the ostium vaginæ. It is evident that this operation is justifiable only where closure of a fistula is impossible, either through the binding down of its margins to the bone with cicatricial tissue or through the complete destruction of the urethra. As the closure of the vagina interferes with married life, the nature of the operation should be explained to the patient beforehand and full permission obtained.

The operation is performed as follows. By pinching up the mucous membrane ascertain where it is most lax, so that the vaginal walls can be easily approximated; the point of closure should be as high up as possible. Mark out with the knife the ring of tissue to be excised. Lay hold of its lower margin and dissect it from below upwards; with the finger in the rectum and the sound in the urethra, we can judge of the thickness of tissue to be removed (compare Fig. 393 with Fig. 394). On each ligature of wire or carbolised silk, two small curved needles are threaded so that *both* ends of the thread may be passed *from above downwards*. The needle must be entered into the vaginal mucous membrane above, carried through the substance of the vaginal wall (without appearing in the wound) and brought out through the vaginal mucous membrane

[1] Du Traitement des Fistules Uro-gén., par la Réunion Secondaire: Paris, 1875.

below; it is difficult to prevent these sutures from catching up either bladder or rectum, but this should, if possible, be avoided. Care is required in the introduction of the first mesial suture as it is the guide for the others.

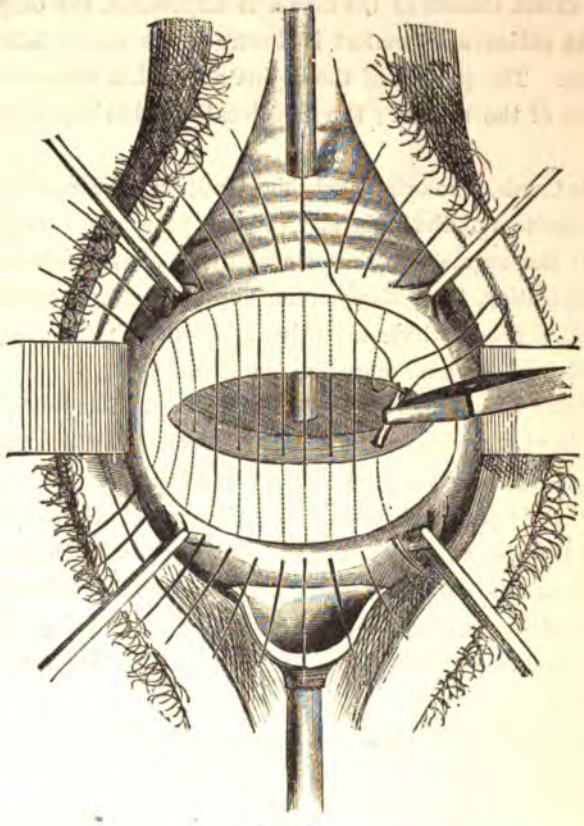

Fig. 393.

Simon's operation for Kolpokleisis. The patient is in the lithotomy posture; the sound has been passed through urethra and fistula, and is seen in the upper portion of the vagina; the perineum is drawn back with the speculum and the labia majora with spatulæ. A band-like piece of tissue has been removed from both the vaginal walls above the ostium; the raw surface is left unshaded in the Figure. The vaginal mucous membrane is held tense by four pair of forceps outside the raw surface, the shaded area within the latter is the upper third of the vagina. An end of the last suture has been passed through one raw surface, the second end is being carried through the other raw surface (H. and K.).

The results of this method are satisfactory as regards the production of complete continence. There is no liability to stagnation of urine or formation of concretions (Hegar and Kaltenbach). Hæmatometra will not occur unless there has been atresia of the cervix uteri. If menstrua-

tion has been in abeyance, it will probably return after the operation; in a case operated on by A. R. Simpson, the patient had not menstruated

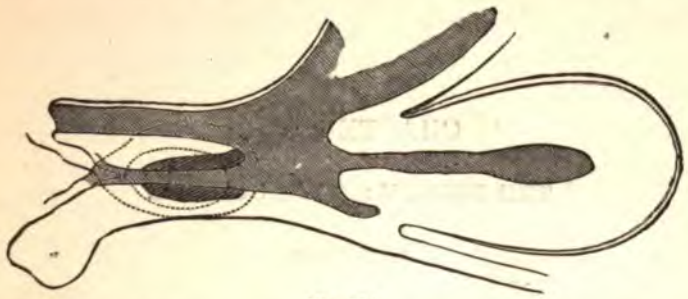

Fig. 394.

Same operation as seen in section to show relation of raw surfaces (shaded dark), position of sutures and common receptacle above for urine and menstrual blood. The bladder and urethra are in upper part of figure (H. and K.).

for a year, but a few weeks after the operation the menstrual blood appeared in the urine.

CHAPTER LIV.

THE RECTUM: COCCYGODYNIA.

LITERATURE.

Allingham—Diseases of the Rectum: Churchill, 1871. *Chadwick*—On the Functions of the Anal Sphincters: Am. Gyn. Trans., 1877. *Cripps*—Cancer of the Rectum: Churchill. *Hart*—Physics of the Rectum and Bladder: Edin. Obst. Trans., 1882. *Ruedinger*—Topographisch-chirurgische Anatomie des Menschen, vierte Abtheilung. *Storer*—The Rectum in its relation to Uterine Disease: Am. Jour. of Obst., Vol. I., p. 66. *Syme*—Diseases of the Rectum: Edin., 1859. *Van Buren*—Diseases of the Rectum: H. K. Lewis, 1881.

Not only is the gynecologist frequently consulted about rectal mischief, but as a matter of fact female patients sometimes refer rectal disease to the uterus or vagina; therefore, in investigating gynecological cases, one has occasionally to satisfy himself that the rectum is not the seat of the affection.

Vaginismus may be caused by fissure of the anus, as we have already seen, and pruritus vulvæ by ascarides from the rectum passing into the vagina.

PHYSIOLOGY OF THE RECTUM.

The anatomy of the rectum has been already considered (p. 34., Vol. I.). The relations of the axes of rectum, anus, vagina and urethra, to one another and to intra-abdominal pressure are of importance. As we have already seen, the vagina and urethra are parallel to one another and to the plane of the brim.

Strictly speaking, the surface whose outer boundary is the brim of the bony pelvis is not a plane surface, inasmuch as the various points in the outline of the brim are not on the same level. The vagina is thus, properly speaking, parallel to the internal conjugate of the brim.

The rectum runs, in its lower 1½-inch, close behind the vagina and parallel to it; the anal canal turns directly backwards so as to cut the vag-

inal axis at right angles. Intra-abdominal pressure acts at right angles to the vaginal walls, as can be noted from the fact that in defecation the Hodge pessary is not driven out of the vagina. Consideration of Fig. 395 will show that the direction of intra-abdominal pressure on the pelvic floor coincides with the long axis of the anus, so that intra-abdominal pressure will act with its full driving force on any body in the anal canal.

The mechanism of defecation is probably the following. According to Hilton, in his now classical book on "Rest and Pain," the lower part of the rectum is sensitive but the upper two-thirds are but slightly so; the rest of the large intestine and the small intestine are non-sensitive. Hilton

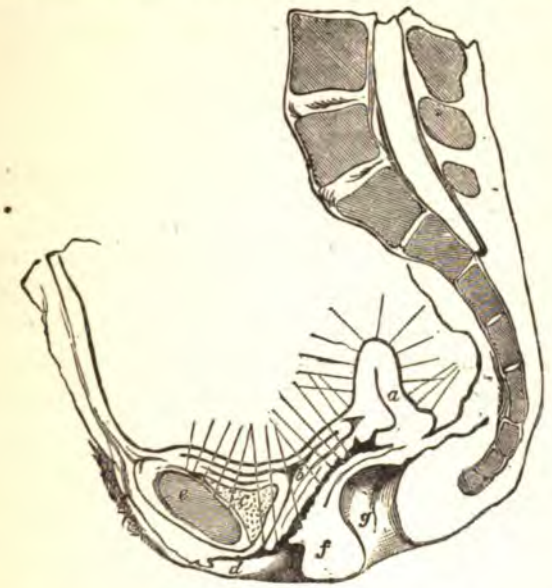

Fig. 395.

To show direction of rectum and of anus in relation to intra-abdominal pressure. For letters see Fig. 63 (Hart).

limits the sensitive portion to the lowest two inches of the rectum—to the part below the so-called sphincter tertius. When there is accumulation of faecal matter in this portion, pain and uneasiness produce the desire to expel these contents. There result the following reflex movements:—

(1) Relaxation of the sphincter ani;

(2) Peristaltic contraction of the circular unstriped muscle;

(3) Shortening of the longitudinal muscle with eversion of the mucous membrane. Since the longitudinal fibres have a fixed point below, their contraction will probably pull the rectum more into the line of the anal axis;

(4) Contraction of the segments of the sphincter tertius.

In this way the lowest portion of the rectum becomes roofed in above by the sphincter tertius and open below. Intra-abdominal pressure drives this portion downwards; and the rectal contents, elongated by peristalsis and depressed by intra-abdominal pressure and eversion of the mucous membrane, are finally brought into the relaxed anal canal from which intra-abdominal pressure readily expels them. Ruedinger's diagram (Fig. 37, Vol. I.) shows well how the levator ani will reinvert the everted mucous membrane.

Inattention to the proper evacuation of the bowels leads to non-sensitiveness of the mucous membrane and is thus one factor in constipation.

EXAMINATION OF THE RECTUM.

This may be done in three ways:

(*a*) By finger (*v.* Vol. I., p. 107),

(*b*) By speculum,

(*c*) By eversion of the anterior rectal wall through digital pressure in the vagina (Storer).

By Speculum.—The anal speculum has usually an oval fenestra; it is passed into the anus in the direction of its long axis, and rotated so that each portion of the anal lining comes opposite the aperture (Fig. 397).

Storer's method is as follows. Place the patient on her side; pass two fingers (or one) half way into the vagina, with the pulps of the fingers on the posterior vaginal wall. Then press these downwards and backwards, and thus evert the rectal mucous membrane through the dilatable sphincter ani which is at the same time pressed open with the fingers of the other hand. This method is most easily employed in multiparæ.

DISEASES OF THE RECTUM.

Women are especially liable to rectal disease owing to the distention of parts accompanying parturition, as well as from their habitual neglect of the regular evacuation of the bowels. As rectal diseases often simulate those of the vagina, a sketch of the more important of them is necessary in a manual of gynecology. We shall therefore consider the following affections:

Displacements of the rectum,
Fissure of the anus,
Piles,
Recto-vaginal fistula;
Functional disturbance of Rectum—Constipation.

Displacements of the Rectum.

These are—Rectocele ;

Prolapsus Recti (*a*) of mucous membrane,

(*b*) of whole thickness of bowel.

For *Prolapsus Recti*, which is properly surgical, see Van Buren or Allingham.

Rectocele is a protrusion of the lower part of the anterior wall of the rectum covered by the posterior vaginal wall, into the lumen of the vagina or even through the vaginal orifice. *Etiology.*—There are two factors—tear of perineal body and pressure of scybala in rectum. *Diagnosis.*—The posterior vaginal wall is seen protruding into the vagina or out at the

Fig. 396.
Rectocele (Schroeder).

vaginal orifice. The diagnosis is made by noting the relations of the protruded vaginal wall and by passing the finger through the anus into the pouch (Fig. 396). *Treatment.*—The patient should wear in the vagina a Hodge or Albert Smith pessary with cross bars ; explain the necessity of a regular daily evacuation of the bowels.

Fissure of the Anus.

This is a crack, or ulceration, of the anal skin or of the mucous membrane covering the internal sphincter. In the edges of the crack there is usually a nerve filament, and below the crack lies the powerful sphincter ani.

This apparently insignificant lesion gives rise in most cases to an un-

bearable and even incredible amount of pain, lasting for hours after th bowels have moved. Hilton's explanation of this is so good that we giv it entire.

"The reason for this anal ulcer being so very painful is the number nerves associated with it; and the cause of the continued painful contra tion which accompanies it lies in the enduring strength of the sphinct muscle. Thus it happens that exposure of those nervous sensory filamen upon the ulcer causes excito-motory or involuntary and spasmodic co

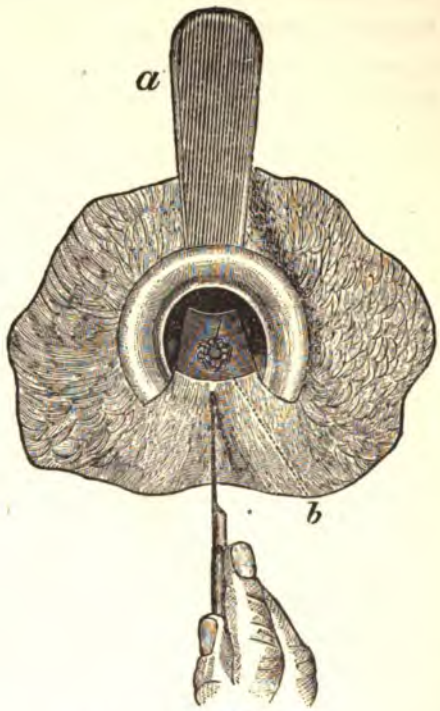

Fig. 397.

Anus with *a* anal speculum *in situ*; it is turned so as to expose in the fenestra a fissure *b*, beneath wh a tenotomy knife has been passed (Hilton).

traction of the sphincter, through the medium of the spinal marrow. T sphincter muscle contracts towards its own centre, and, as long as t muscle is in a state of contraction, it brings the sensitive edges of t ulcer into forced contact; this excites more muscular contraction, a thus, by time and exercise, the muscle becomes hypertrophied, massiv and increased in dimensions."

Symptoms.—The patient complains not so much of pain while t

bowels are being moved as *of an unbearable pain coming on after the evacuation and continuing for some hours.* The pain is described as unendurable, causing the patient to dread and postpone natural motions. There are often iliac pains and vaginismus ; this last symptom is not infrequent.

Physical Signs.—By speculum or eversion, the crack is seen.

Treatment.—Chloroform the patient, pass a tenotomy knife beneath the base of the ulcer (Fig. 397) and cut upwards. This divides the muscular fibre so that the irritated edges can no longer be brought together. The fissure gets rest and heals readily ; a cure is thus effected.

Another and very good plan is to chloroform the patient, and introducing the thumbs (with the dorsal surfaces in contact) to stretch the anus by forcibly separating them ; this ruptures the muscular fibre and acts just as the knife does, and is especially good when the fissures are multiple.

The bowels are not to be moved for a day or two ; the patient has then some pain when the motion is passing, but none after it.

Piles.

Hilton has pointed out that at the anus the line of demarcation between skin and mucous membrane is marked out distinctly by "the white line," as he terms it. This line is of great practical importance, as we shall see.

Piles are small tumours at the anus, on either side of this white line. They consist of dilated veins embedded in connective tissue and covered by skin or mucous membrane. We speak of external piles, *i.e.*, those outside of the white line and covered by skin, and internal piles, *i.e.*, those inside of the white line and covered by mucous membrane. Occasionally we have, as a special form of external pile, a dilated vein outside of the white line and usually containing a clot (venous pile).

Symptoms.—Venous piles cause great pain ; while external piles, unless inflamed, occasion little inconvenience ; from external piles, there is bleeding when the bowels are moved.

Physical Signs.—The venous pile is a purplish tumour outside of the white line ; external piles are like tags of skin, or are more or less distended ; internal piles are cherry-red and easily bleed.

Treatment.—1. When venous piles contain a clot, incise and turn out clot.

2. For internal piles, employ the following *palliative* treatment. Give sulphur confections when necessary.

℞. Confectionis Sulphuris..... ℥ ij.
Sig.—Dessertspoonful at night.

Order gall and opium ointment to be applied.

℞. Unguenti Gallæ c. Opio..... ℥ ij.
Sig.—As directed.

For any abrasions, order iodoform ointment (p. 204) or bismuth suppositories.

The *radical* operative treatment belongs more to the surgeon.

Recto-vaginal Fistula.

The situation of such a fistula is shown in Fig. 357. It may be due to carcinomatous or syphilitic ulceration, or to injury received during parturition. The last is alone amenable to operative treatment, which is the same as for a vesico-vaginal fistula.

Functional Disturbance of Rectum—Constipation.

Women are usually exceedingly careless in the matter of regulation of the bowels; very often, evacuation is practised once a week or even at longer intervals. This is in many respects not their fault, but is due to the insufficient water-closet accommodation, to modesty, and to the fact that evacuation is for evident reasons postponed during menstruation.

When consulted for constipation, the medical man should insist on the value of a daily evacuation at a fixed hour; this educates the bowels to demand it regularly. All quack pills should be tabooed as dangerous. The diet should be regulated; bran-bread, porridge and milk, stewed fruit, figs, etc., taken as part of food. The following pill is good.

℞. Extracti Nucis Vomicæ,
Extracti Belladonnæ .....āā gr. ½.
Pilulæ Colocynthidis et Hyoscyami ..... gr. iij.
Fiat Pilula .....mitte tales vj.
Sig.—One occasionally.

The nux vomica and belladonna strengthen the peristalsis of the bowel: the colocynth and hyoscyamus pill is purgative; aloes and iron pill may be substituted for it.

The purgative mineral waters are very useful. The best are the Friedrichshall, Hunyadi Janos, and Aesculap. The patient should take in the morning a wineglassful or half-tumblerful with an equal amount of hot water; the taste may be masked by the juice of a lemon with sugar. The Carlsbad salts are good and may be used as already directed (p. 13). Very often an enema of cold water is helpful. The medical man should deprecate the habitual use of purgatives, and insist on natural and daily evacuation.

The aloes and iron pill is good in sluggishness of the lower bowel. Rhubarb is bad as a habitual purgative, owing to its tendency to constipate after purging; the well-known "Gregory's Mixture" should not be used as a habitual purgative, but is good in diarrhœa inasmuch as it first purges and then binds. Fluid magnesia, castor oil, and some of the milder salines (*e.g.*, the easily taken Seidlitz powder) may be employed. Blue pill should be avoided; Euonymium or Iridin are better hepatic stimulants (*v.* p. 248).

COCCYGODYNIA.

LITERATURE.—*Hildebrandt*—Die Krankheiten der äusseren weiblichen Genitalien: Stutt., 1877, S. 127. *Nott*—N. O. Med. Jour., May, 1844. *Simpson, Sir J. Y.*—Dis. of Women: Edin., 1872, p. 202. *Thomas*—Dis. of Women: Lond., 1880, p. 151.

By this we understand a painful condition in the region of the coccyx induced by sitting, walking, and the various muscular contractions associated with defecation and coitus. When we consider the anatomy of the coccyx, its muscular attachments (to the levator ani, coccygeus, external sphincter ani, and gluteal muscles), as well as the strain put on it when driven back during parturition, we are not astonished that in some cases there should be inflammatory changes around and in it causing pain in its movement.

Symptoms.—The chief symptom is pain on sitting, walking, and defecation.

Physical Signs.—By digital pressure on the coccyx and examination per rectum, the seat and nature of the pains are made out.

Treatment.—(1) Pass a tenotomy knife beneath the skin on the posterior aspect of the back, and free its lateral and apical muscular attachments; or (2) amputate the coccyx. To do the latter, make a vertical mesial incision over the posterior aspect of the coccyx; seize its tip and pull it well back; then free its muscular attachments with the knife, keeping close to the bone; finally separate it at the sacro-coccygeal joint.

APPENDIX.

SYPHILIS—CHLOROSIS—ETIOLOGY OF UTERINE DISEASE—CASE-TAKING—LITERATURE.

INDEX OF AUTHORS AND SUBJECTS.

APPENDIX.

SYPHILIS.

LITERATURE.

Bäumler—Article "Syphilis" in Ziemssen's Cyclopædia of Medicine. *Fournier*—Syphilis and Marriage, translated by A. Lingard: London, 1881. *Lancereaux*—A Treatise on Syphilis, Historical and Practical: New Sydenham Society, 1868. *Hunter, John*—A Treatise on the Venereal Disease: London, 1786. *Hutchinson, Jonathan*—Constitutional Syphilis: Reynold's System of Medicine, London, 1866, Vol. I., p. 287. *Ricord*—Lettres sur la Syphilis: Paris, 1863.

Though syphilis does not specially belong to diseases of women, it comes so frequently under the notice of the gynecologist that no apology is required for introducing it here. The compass of this work admits of but a brief summary of this very important subject; for fuller details, we refer the student to the literature quoted above.

For convenience, we shall consider it under the following heads:—

1. Phenomena of an attack of syphilis and its treatment;
2. Syphilis and marriage;
3. Syphilis and pregnancy.

PHENOMENA OF AN ATTACK OF SYPHILIS.

We have arranged in a tabular form on page 328 the leading facts, as given by Bäumler in his admirable article. Ricord's division of the progress of the disease into three periods—primary, secondary and tertiary—is the one usually adopted. Lancereaux, dividing the first into two, names four periods as follows: period of incubation, period of local eruption or of the primary lesion, period of general eruption, period of gummy products.

The succession of the various phenomena will be easily remembered if

Period.	Definition.	Duration.	Phenomena.	Clinical Characters.	General Pathological Changes.	Relation to Therapeutics.
PRIMARY . . .	from infection to appearance of general symptoms;	nine to eleven weeks;	appearance of the hard chancre at from the *third to the fourth week*, enlargement of neighbouring glands;	flat papule, afterwards covered with a crust, which has a *hard base* and is localised at point of infection;	dense cellular infiltration of tissues of cutis or of mucous membrane—most marked in tunica adventitia of blood-vessels, increased formation of connective tissue;	cauterisation has very rarely checked further progress.
SECONDARY..	from appearance of general symptoms to an indefinite date;	for months or years, after which the disease exhausts itself or tertiary symptoms develop;	skin eruptions, sore throat, mucous patches, enlargement of glands of body generally, falling out of hair, disease of nails, iritis and retinitis, periostitis;	affections, superficial and symmetrical, of eyes—tonsils, skin on both sides—healing without loss of tissue;	circumscribed dilatation of blood-vessels with exudation of white and red corpuscles into their sheaths or the surrounding tissue, extravasated blood-pigment producing coppery-colour, epithelium of mucous membrane thickened (producing white patches) or ulcerated;	benefited by mercury.
TERTIARY...	does not commence, as a rule, till some years after secondary has disappeared;	indefinite;	gummatous deposits in liver, lungs, bones and brain;	new formations deeply seated and symmetrical, tending to degenerate or healing with loss of tissue;	the typical gumma consists of a collection of closely packed nucleated cells, which at the centre undergoes fatty degeneration and at the circumference develops a capsule of fibrous tissue—it thus closely resembles a caseating tubercular deposit;	benefited by iodide of potassium, mercury sometimes injurious.

we compare them with those of an attack of one of the exanthemata, measles for example: there is *infection* by the poison; a *period of incubation*, during which the system is becoming saturated with it; the development of *fever;* the appearance of *eruptions;* finally, certain *sequelæ*—the changes of the tertiary period.

In the primary period, syphilis is a *local* affection; in the secondary, it is a general *blood-affection;* in the tertiary, it is a general *tissue-affection.* The primary sore is the depôt in which the poison is generated and from which it is gradually served out till the whole system is permeated and the eruptions of the secondary period appear. The secondaries are transient changes in healthy tissue excited by syphilised blood; they are therefore multiple and symmetrical. The tertiaries are permanent changes in syphilised tissue due to an external exciting cause; they are single and asymmetrical.

The *rapidity* with which the disease passes through the three stages varies indefinitely; in some severe cases, the changes characteristic of the tertiary period may develop in a few months. Just as when scarlet fever attacks a household some have only the sore throat, while others are more seriously affected according to the constitution of each, so the *susceptibility* of individuals to the syphilitic poison varies; its constitutional effects are most marked in scrofulous subjects and those given to alcohol.

The saturation of the system with the poison during the secondary period creates an *immunity* from it which diminishes afterwards; the *communicability to offspring* diminishes after the second period, so that marriage becomes justifiable.

Of the *nature* of the poison, nothing is yet known. It is present in the primary sore, the condylomata and mucous patches of the secondary period, and, at a certain stage, in the whole blood of the patient. It is probably not present in normal secretions—such as milk, saliva, and urine. As we shall see afterwards, the semen of the syphilitic parent produces a syphilitic fœtus though apparently it is not directly contagious.

The *period of incubation,* that is the time which elapses between the infection and the appearance of the hard chancre, is approximately stated as from three to four weeks. Of 32 cases tabulated by Bäumler, in which its duration was definitely ascertained, 11 were from fifteen to twenty days and 12 from twenty-one to twenty-five; the shortest was ten, the longest forty-four. After this, a second period of about six weeks elapses before the skin eruptions appear. The total duration, therefore, of the primary period

is from nine to eleven weeks. In the case of hereditary syphilis, there is also an apparent period of incubation after the birth of the child ; the skin eruptions and condylomata do not appear for three weeks. Even where syphilis is to show itself in general weakness, the child is often born in perfect health, but after some weeks rapidly dwines away ; it would appear that the effect of the poison is not incompatible with healthy intra-uterine life, but the child is heavily handicapped in the struggle for existence and rapidly succumbs to external influences.

The *primary sore* in the female is not often seen by the practitioner ; the patient does not seek advice because it does not attract attention, or the condition is masked by the existence of soft chancres. It may be present "as a dry or ulcerating induration upon one of the labia majora, or else as a simple parchment-like thickening upon the borders of the labia minora, or in the form of several papules in process of conversion into flat condylomata" (Bäumler) ; when within the ostium vaginæ or on the cervix uteri, it readily escapes observation.

Hard and Soft Chancre.—The soft chancre has the following characters : it develops *without a period of incubation* in the course of four-and-twenty hours ; it is usually multiple in the female, as it is a contagious though local infection ; the neighbouring glands are much enlarged and tend to suppurate ; it is *not followed by the symptoms of constitutional syphilis.* The absence of a period of incubation and of constitutional symptoms are the points which distinguish it from a hard chancre. We must not forget that the two may occur together, and that where soft chancres have been present the hard one may easily escape detection ; we can thus explain the often-repeated observations that constitutional symptoms may follow a soft sore, and that a soft sore, in the female, may produce a hard sore in the person infected by her.

The *fever*, which *precedes* the outbreak of the manifestations of the secondary period, is present in about one case in five ; it consists of one or several distinct rises in temperature and is sometimes intermittent. When accompanied with pain in the joints, it makes the case resemble one of articular rheumatism. There is further intense pain in the head (worse at night), and pains in the "nape of the neck, the back, the loins, the costal parietes and the large joints" (Lancereaux).

The *skin eruptions* in syphilis have the following characteristics :—they are of a *coppery-red colour* which is due to alteration in the pigment of extravasated blood, this pigmentation is most marked in patients of dark com-

plexion or when the local skin changes have progressed slowly; they are of a *polymorphous character*, papules, vesicles and pustules being present simultaneously; they have an *annular form* due to retrogression in the centre with extension at the periphery; as a rule, there is *no itching*, and the eruption may appear without the patient's being conscious of it. The diagnosis of a specific eruption is not difficult when we have the history and other accompaniments of syphilis (loss of hair, sore throat, and enlarged glands) to guide us; the sudden development of the syphilitic roseola with accompanying fever, might be mistaken for measles, small-pox, or typhoid. When the syphilitic papule develops between folds of the skin where there is much moisture, as between the fingers and toes or at the angle of the mouth, it takes on a *condylomatous form*. We only enumerate the various forms of eruption here. Besides the roseola and papular eruption, there are a syphilitic psoriasis, lichen, acne, impetigo, ecthyma, rupia, lupus. For fuller information see Bäumler or Lancereaux.

The *loss of hair* is the result of changes in the skin, but may occur independent of such changes; the hair becomes dry and falls out, leaving the skin normal (not smooth and shining as in alopecia areata). Changes in the nails, onychia and paronychia, also occur. The enlargement of the glands of the body generally is best noted in the cervical glands.

On *mucous membranes*, we may have either superficial erosions or milk-white spots due to thickening of the epithelium. The sore throat so characteristic of syphilis appears first as a diffuse redness; then mucous patches, which ulcerate, appear on the tonsils; finally, the tonsils become chronically enlarged.

The changes of the tertiary period are the most serious. The dangers as to health and life will depend upon the importance of the organs affected by the gummatous deposit; when symptoms due to the formation of such deposit in the brain develop, the prognosis is very grave. According to Hutchinson and Bäumler, the changes of the tertiary period are not due to the direct action of the syphilitic poison; but the syphilitic virus has so altered the general condition of the tissues as to render them peculiarly liable to inflammatory changes on a slight exciting cause. The severity of the tertiaries varies indefinitely and bears no relation to that of the primary or secondaries. As Ricord happily expresses it, syphilis is an uncertain creditor; sometimes allowing the syphilitic to escape with a slight penalty, at other times exacting the last pound of flesh; in all cases, health is mortgaged.

Treatment.

The primary sore, when seen, calls for no treatment. *Cauterisation* will not destroy the poison in the individual as already it has spread beyond the exact seat of the chancre—the test that the glands are not enlarged to the touch is too rough to be a proof that the poison has not extended to them; as a means of preventing the communication of the disease, it is unnecessary—in ninety-nine per cent. of the cases it is the husband who has communicated syphilis to his wife. When the primary sore is large, it should be kept clean and washed with black wash; when painful and not healing well, iodoform is very useful. The constitutional treatment by mercury should be begun as soon as the primary sore is recognised, as by this means the secondaries may be neutralised (Hutchinson).

The secondaries are treated by mercury. For condylomata, there is nothing equal to calomel.

℞. Calomelanos ..... ℥ ii.
Sig.—To be dusted on as directed.

Mercury may be given internally in three ways—(1) by the mouth, (2) by inunction, (3) by the calomel bath.

By the mouth we give the metal in the familiar blue pill or as hydrarg. c. creta. The perchloride is given as $\frac{1}{16}$ of a grain in pill.

The red iodide is also good; it is more active when freshly prepared from the perchloride as follows.

℞. Hydrarg. perchloridi ..... gr. i.
Potass. iodidi ..... ℥ i.
Aquæ ..... ℥ ii.
Sig.—A teaspoonful thrice daily.

For *inunction*, blue ointment is employed. Take about twenty grains of the ointment and rub it into the skin for about ten minutes. The inunction should be made methodically on different parts of the body in rotation—arms one day, chest and abdomen the next, the back the following day, and so on (*v.* Sigismund). This method is best where we wish to have the action of mercury speedily—as when important organs are becoming affected, or when the digestive system is disturbed (Bäumler).

The *calomel bath* is recommended by Lee[1] and is given as follows. Strip the patient, place her on a stool with a blanket over the whole person and overhanging the stool; place under the stool a tin plate with about eight grains of calomel on it; there is a trough, surrounding the calomel on the plate, containing water which is made to evaporate slowly by means of a spirit lamp; the steam from the water carries the fumes of the calomel upwards with it. The fumigation lasts twenty minutes and the patient goes at once to bed afterwards.

The mercurial treatment may be discontinued after three or four months, if the secondaries have not developed; after a year, if they are present. Fournier continues it for two years and lays great stress on his method of "successive or intermittent treatment": mercury and iodide of potassium after a time lose their effect, a tolerance being produced; every two or three months, their use must be discontinued for a month or more so as to ensure their action.

The patient must be warmly clad, wearing flannel next the skin, and be confined to the house and even to bed if the eruptions are severe or the weather cold; for wealthier patients, a winter's residence in the south of France is beneficial. While mercury is being taken, the mouth must be rinsed thrice daily with warm water containing an aromatic and the teeth carefully brushed night and morning; this diminishes the liability to stomatitis.

During the tertiary period, iodide of potassium is given in doses of five grains, increased to ten, thrice daily.

SYPHILIS AND MARRIAGE.

It is fortunately a very rare occurrence in this country for the gynecologist to be consulted as to marriage by women who have syphilis, but the interests of his patients come under his notice indirectly when advice is sought by a man who has had syphilis but is intending to marry. Under what circumstances is marriage justifiable? This question can only be answered after a thoughtful recognition of all the interests which will be involved, and a thorough examination of the patient who asks advice. We have to consider the interests of a wife, of children, of the father of a household. We must remember that a wife may become infected indirectly through the fœtus, as well as directly through contact with the

[1] Lee—Syphilis: Holme's System of Surgery, London, 1870.

manifestations of the secondary period; that syphilitic children are the blight of married life; that the changes of the tertiary period sometimes, though rarely, produce permanent incapacity for work and even fatal results. For a full description of these dangers, we refer the student to Fournier's work on "Syphilis and Marriage." The examination of the patient should determine the following points: the date of his contracting the disease; the severity, duration, and recurrence of the local eruptions; the treatment adopted; the present existence of abrasions on the penis, the lips, or other parts, as possible foci of contagion.

Fournier lays down the following conditions of admissibility to marriage: (1) Absence of actual specific symptoms at the time of marriage—these symptoms being both a possible source of infection and a key to the progress of the disease; (2) Advanced age of diathesis, the more recent the syphilis the more numerous and greater are the dangers imported into marriage; (3) Period of immunity sufficiently long since last manifestations—three or four years a minimum; (4) Non-menacing character of the diathesis, as shown by the absence of tendency to relapses and the avoidance of important organs; (5) Sufficient specific treatment.

Of these 2 and 5 are the most important; or as Fournier graphically expresses it—"Time, on the one part, and the treatment on the other; here you see the two great major conditions to exact of all syphilitic patients before opening to them the marriage-gates."

SYPHILIS AND PREGNANCY.

This subject is important, not only because syphilis takes on a more rapid development in the patient herself during this period, but also because we have to consider the effects on the fœtus. There are three ways in which syphilis complicates pregnancy.

1. Conception occurs in a patient already syphilitic: the ovum is syphilitic, the spermatozoa may or may not be so.

2. Conception occurs in a healthy patient who becomes *directly* infected at the act of insemination or at some subsequent period during pregnancy.

3. Conception occurs in a healthy patient: syphilitic spermatozoa impregnate a healthy ovum; the mother is not infected directly with the poison, but *through the syphilitic fœtus.*

With regard to the first condition, we note that the syphilitic poison wears itself out after a series of pregnancies, especially when proper

treatment has been adopted; thus a syphilitic patient may have first a series of abortions, then a premature still-born child, and finally give birth to a living child at full time. With regard to the second, when the mother is infected at the same time as the ovum is impregnated, the usual symptoms of syphilis develop at the tenth week of gestation; the fœtus is, of course, syphilitic. In the third form the spermatozoa are the carriers of the infection, the fœtus is the *primary sore*—the depot in which the poison is generated, and from which it is served out through the system of the mother; syphilis thus develops without any local source of contagion in the husband or primary sore in the wife. This form is therefore known as "syphilis by conception" (Fournier), or "syphilis by fœtal-blood-contamination" (Hutchinson). When syphilis is acquired in this way, the mother rarely has the full course of secondary phenomena. Usually these are obscure and develop gradually, loss of hair and general weakness being the only manifestations. Sometimes there is no evidence of syphilis at all—Hutchinson mentions a case in which the mother gave birth to eleven syphilitic children, and yet showed no manifestation of syphilis. Just as in vaccination the child really passes through an attack of small-pox, the only manifestation being the local pustule; so the mother has passed through an attack of syphilis, the only manifestation being the syphilitic child.

Thus Hutchinson explains the fact, first recorded by Colles, that a healthy woman may nurse her syphilitic child without being infected by it; while the same child, given to a healthy nurse, would produce a chancre on her breast and all the phenomena of an attack of syphilis. A woman who has just given birth to a syphilitic child acquires therefore the same immunity as regards a second attack as one who has had an attack of syphilis.

The Clue to the Existence of Syphilis is often Given by Pregnancy.—Thus a series of abortions (without any other cause to explain them) creates a suspicion of syphilis. Repeated occurrence of death of the fœtus in utero, at the seventh or eighth month, is probably due to this cause; this is confirmed by our finding, on splitting up the ends of the long bones, the "speckled discolouration and softening of the spongy tissue of the bone in the neighbourhood of the epiphyses" described by Wegner as pathognomonic of syphilis.[1] If the infant has "snuffles" (due to

[1] Virchow's Archiv., B. 50, S. 304.

catarrh of the nasal mucous membrane), skin eruptions and condylomata, the diagnosis of syphilis in the parent is certain.

We should always examine the grown-up children for traces of hereditary syphilis. These are usually found in the eye and teeth. In the *eye* there occurs at the second dentition, and at puberty in girls, an *interstitial keratitis*;[1] the opacity, beginning at the circumference, extends to the centre and disappears in the same order, lasting for a period of from five to twelve months. The changes in *the teeth* have been fully described by Hutchinson.[2] The teeth stand apart with interspaces between, and are rounded or peggy in form instead of flat; they usually exhibit in their border a broad shallow notch, or two or three serrations; owing to their softness they rapidly wear away, and from the deficiency of enamel have a dirty greyish colour. The teeth thus affected are the incisors and canines of the permanent set, especially the *upper incisors* (Fig. 398). The

Fig. 398.

Teeth from a case of hereditary syphilis. The upper central incisors are dwarfed and have a broad vertical notch in their edge (Hutchinson).

change in form is due to syphilitic stomatitis during the first weeks of life which affects the development; if a syphilitic patient escapes stomatitis, the teeth will not be affected.

The Benefits of a Mercurial Treatment are Distinctly Brought out in Syphilis and Pregnancy.—Under efficient treatment the duration of pregnancy becomes longer, and finally a full-time healthy child is born. Mercury seems to neutralise the syphilitic virus in the blood, even though the syphilis be not cured; Fournier mentions a case where a patient gave birth to syphilitic children, then under the influence of mercury had healthy children, and discontinuing it had again a syphilitic child.

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[1] Hutchinson, Jon.—Memoir of Certain Diseases of the Eye, etc.: London, 1863.

[2] Trans. Path. Soc. London, Vol. IX., p. 449: Report on the Effects of Infantile Syphilis in Marring the Development of the Teeth. Ibid., Vol X., p. 287: Report on Malformations of the Teeth as Indicative of Diathesis; illustrated by coloured plates.

CHLOROSIS.

LITERATURE.—*Balfour, G. W.*—Clinical Lectures on Diseases of the Heart: Churchill, 1882. *Fothergill, T. M.*—Practitioner's Handbook of Treatment: Macmillan & Co. *Gibson*—The Cephalic Murmur of Anæmia: Brit. Med. Journ., Jan., 1882. *Immerman*—Articles on Chlorosis and Anæmia: Ziemssen's Cyclopædia. *Niemeyer*—Text-Book of Practical Medicine (Humphrey's & Hackley's Tr.): H. K. Lewis, Lond., 1880. Immerman's articles are very exhaustive and give the literature fully. Niemeyer is also good.

Chlorosis in a mild form is an exceedingly common affection among young women; although belonging properly to the province of the physician, it comes more frequently before the gynecologist owing to the menstrual irregularities which frequently accompany it.

NATURE AND PATHOLOGY.

Chlorosis is a blood-disease characterised by deficiency in the red blood-corpuscles, and occurring in young women who have primarily a hypoplasia of the arterial system. Virchow holds that in cases of severe chlorosis we have an abnormally small lumen of the aorta, which may be so narrow as barely to admit the little finger instead of the thumb as it should do; and that, associated with this, we have abnormal arterial branches and some changes in the arterial coats. It would explain many clinical facts in chlorotic cases if it were found that the blood glands shared in this hypoplasia, but this has not yet been established. The blood itself, in ordinary and curable cases, is not deficient in its nutrient constituents, which are in excess. The defect is in the red blood-corpuscles and, more especially, in the amount of hæmoglobin they contain; the proportion of iron in the blood is diminished. Chlorosis is therefore a blood disease where, from developmental defects, slight or excessive, the hæmoglobin becomes deficient. What starts this "oligochrosis" it is difficult to say. Chlorosis is common in hard-worked servants and overtasked school girls. It has no relation to sexual excitement; the generative organs may be infantile or over-developed.

SYMPTOMS AND PHYSICAL SIGNS.

The symptoms are inability to fulfil ordinary duties, and breathlessness on exertion—especially on going up stairs. There is indigestion, with marked constipation and anæmic headaches. There may also be

neuralgia, and there is sometimes a nervous cough. Amenorrhœa is usually present, but is often preceded by menorrhagia. The physical signs are as follows:

(*a*) *Appearance.*—The patient is markedly pale, even greenish or yellowish in tint. The lips are bloodless, and the palpebral conjunctiva white. The patients are usually plump; there is never emaciation in uncomplicated chlorosis. Often the feet and ankles swell at night.

(*b*) *Auscultatory Phenomena.*—There is almost always a loud venous hum at the root of the neck on the right side, a systolic murmur outside the pulmonary area and one at the apex.

Careful examination of the lungs, liver, and spleen, reveals nothing abnormal.

The symptoms already given are easily explained. The breathlessness is of course due to the deficiency in hæmoglobin—the oxygen-carrier. The plumpness is explained by deficient oxidation of fats and by the hyperalbuminosis already noted. The venous hum and murmurs have their exact nature disputed. It should be noted, however, that the cardiac murmurs are not due to organic heart-disease.

DIAGNOSIS.

A consideration of the symptoms and physical signs we have given will render the diagnosis easy. The lungs should however, in all cases, be carefully examined; and it should not be forgotten that pregnancy may occur while chlorosis is running its course.

PROGNOSIS.

This is good unless in severe and recurrent cases where the arterial hypoplasia is marked.

TREATMENT.

There is no better remedy for chlorosis than Blaud's pills. These contain sulphate of iron and carbonate of potash made up as undernoted; as the result of the combination, the carbonate of iron is formed.

℞. Ferri sulphatis,
Potassæ carbonatis.....āā gr. iiss.
Mucilaginis tragacanthæ ..... q.s.
Fiat pilula..... mitte tales 96.
Sig.—Three, thrice daily.

Nine pills must be taken per diem continuously for 6 to 8 weeks, by which time a complete cure usually results.

No course of treatment is so valuable and brings so much "kudos" to the physician. Before the pills are given, the state of the tongue and bowels should be looked to. If the tongue is foul and the bowels constipated, we may give the following:

℞. Magnesiæ sulphatis..... ℥ j.
Quiniæ sulphatis ..... gr. xxiv.
Acidi sulphurici dil..... ♏ iij.
Tincturæ capsici ..... ♏ j.
Aquam ad..... ℥ vj.

Sig.—Tablespoonful twice or thrice daily.

This is taken for a week. The Carlsbad salts or Friedrichshall water may be substituted. This hint as to the preliminary purgation is a good one, and is given by Milner Fothergill; if not attended to, the result will be disappointing, as the iron will not be so readily absorbed by the intestinal mucous membranes.

Many recommend change of air and diet, with stimulants; these are no doubt beneficial to the general health, but the only actual remedy is the administration of iron after preliminary purgation.

When there is menorrhagia, it must be treated (*v.* p. 248). The amenorrhœa needs only the iron unless there is developmental defect, and then nothing does good. Excessive white discharge may be treated in the unmarried by cold hip-baths, and an occasional aloes and iron pill. We have discussed chlorosis so far in order to warn the student to beware of attaching importance to the mere gynecological symptoms which present themselves, to the neglect of the general condition of which they form a less important part.

Note.—The original composition of Blaud's pills is as follows: Sulphate of iron, carbonate of potash, of each half an ounce; marshmallow root, thirty grains; gum tragacanth, q. s. to make 120 pills.

The following are the proportions in the pill as made by Messrs. Duncan, Flockhart & Co. of Edinburgh: Ferri sulph. siccat., 15; Potass. carb. siccat., 15; Pulv. gum acaciæ, 3; Syrup. simp., 9. Divide in 5-gr. pil.

Blaud's pill gives a ferrous carbonate and a potash salt, the decomposition taking place after the pill is swallowed.

In Vallet's pill, which is popular on the continent, the decomposition is effected first and the carbonate of iron thus freshly formed is used to make the pill. The

quantities taken to make Vallet's pill are as follows: Protosulphate of iron (in crystals), 10; Carbonate of soda (in crystals), 12; White honey, 3; Sugar of milk 3. Divide in 5-gr. pil.

ETIOLOGY OF UTERINE DISEASE.

LITERATURE.—*Bennet, J. Henry*—A Practical Treatise on Inflammation of the Uterus and its Appendages: London, 1849. *Emmet*—The Principles and Practice of Gynecology: J. & A. Churchill, London, 1880. *Hewitt, Graily*—The Mechanical System of Uterine Pathology: London, Longmans, Green & Co. *Jacobi*—The Question of Rest for Women during Menstruation: London, 1878. *Simpson, Sir J. Y.*—Collected Works: Edinburgh, A. & C. Black, 1872. *Thomas, T. G.*—A Practical Treatise on the Diseases of Women: London, Henry Kimpton, 1880.

Diseases of the uterus and its appendages are the same essentially as diseases elsewhere—the uterus has no pathology special to it, more than the stomach or brain. The attempts made (by Bennet, Emmet, Hewitt, and others) to found a system of uterine pathology, in which some special lesion (whether an inflamed cervix or an anteflexed uterus) was to play the leading part in disease and to be not only an important lesion itself but the parent of most other pelvic diseases, have been unsuccessful. Those interested in this subject may consult the literature we have given.

Diseases of women are, however, modified by certain anatomical points and functions connected with the pelvic organs; the modifications in the pelvic floor for parturition; the functions of menstruation, sexual intercourse, pregnancy and parturition. It would be of the greatest interest to trace the influence of these functions, when abnormal, in causing disease as well as in helping to perpetuate it; but our space is too limited for this. One familiar instance will render our meaning clear. The student's ordinary dissection-wound of the finger soon makes him aware of the lymphatic and glandular anatomy of his arm; the axillary glands become swollen and tender, and he is feverish and out of sorts for some days. Soon, however, all this passes off and he becomes quite well. Let us take now such a case as curetting the uterus for endometritis. In some instances the patient becomes feverish after the operation from absorption of septic matter by the cut surface; a moderate cellulitis in the utero-sacral ligaments results. This diminishes in intensity, but becomes aggravated at the next menstrual period from the increased pelvic congestion. This continues time after time and ultimately dysmenorrhœa develops. Why and how? The cellulitis has affected the utero-sacral ligaments and their cicatrisation has produced pathological anteflexion. The inflammation resulting on the one

hand in the student's finger and on the other in the patient's endometrium is precisely the same—the result of septic absorption by the lymphatics. The difference is due, in the case of the latter, to the fact that the inflammation has occurred in a region with a peculiar anatomical structure and with certain functions which modify and perpetuate the lesion.

We might multiply instances illustrating this point, but the above one will show our meaning.

The function of menstruation, when disturbed, causes hæmatocele, dysmenorrhœa and other allied affections. Parturition causes laceration of the cervix, subjecting the patient to the risk of septic infection ; and, further, tends to cause prolapse of the uterus. With sexual intercourse may be associated vaginismus, ovaritis, gonorrhœa, etc. Almost every disease given in the preceding pages will illustrate our statements here.

Some minor points are worthy of consideration as favouring uterine disease ; such are carelessness at the menstrual periods and after abortion, tight-lacing, and neglect of the due evacuation of the bowels and bladder.

The gynecologist can therefore help to limit disease by insisting on the proper hygiene of the bowels and bladder, by advising rest during menstruation and after abortion ; and he does this more directly by taking care in all cases to prevent septic infection, to treat abortion thoroughly, and to avoid undue operative interference.

CASE-TAKING.

LITERATURE.—*Emmet*—Gynecology : London, 1880, p. 57. *Simpson, A. R.*—Contribution to Obstetrics and Gynecology, Method of Case-Taking in Gynecology, p. 317.

It is of importance to give some hints as to case-taking or the investigation of cases of diseases of the female sexual organs.

In hospitals, some form of case-taking card is usually employed ; and we purpose describing the method of case-taking adopted by Professor Simpson in the Buchanan Ward (for the Diseases of Women) in the Edinburgh Royal Infirmary.

Our first object is to learn all we can from the patient herself. This information is considered under six heads and comprised under the term ANAMNESIS, a convenient word, which literally means "a statement of what she recollects." The questions asked under "Sexual History" need little explanation (see next page).

ANAMNESIS.

1. Name; Age; Occupation; Residence; Married, Single, or Widow; Date of Admission.

2. Complaint and Duration of Illness.

3. General History of—(*a*) Present Attack; (*b*) Previous Health; (*c*) Diathesis; (*d*) Social Condition and Habits; (*e*) Family Health.

4. Sexual History.

(1) *Menstruation*—

A. Normal—(*a*) Date of Commencement; (*b*) Type; (*c*) Duration; (*d*) Quantity; (*e*) Date of Disappearance.

B. Morbid—(*a*) Amenorrhœa; (*b*) Menorrhagia; (*c*) Dysmenorrhœa.

(2) *Intermenstrual Discharge*—(*a*) Character; (*b*) Quantity.

(3) *Pareunia.*

(4) *Pregnancies*—(*a*) Number; (*b*) Dates of First and Last; (*c*) Abortions; (*d*) Character of Labours; (*e*) Puerperia; (*f*) Lactations.

5. Local Functional Disturbances—(*a*) Bladder; (*b*) Rectum; (*c*) Pelvic Nerves and Muscles.

6. General Functional Derangements—(*a*) Nervous System; (*b*) Respiratory System; (*c*) Circulatory System; (*d*) Digestive System; (*e*) Emunctories.

PHYSICAL EXAMINATION.

1. General Appearance and Configuration.

2. Mammæ.

3. Abdomen—(*a*) Inspection; (*b*) Palpation; (*c*) Percussion; (*d*) Auscultation; (*e*) Mensuration.

4. External Pudenda.

5 Per Vaginam—(*a*) Orifice; (*b*) Walls and Cavity; (*c*) Roof; (*d*) Os and Cervix Uteri.

6. Bimanual Examination (Abdomino-Vaginal, Recto-Vaginal, Abdomino Rectal, Abdomino-Recto-Vaginal, Abdomino-Vesico-Vaginal)—

(1) *Uterus*—(*a*) Size; (*b*) Shape; (*c*) Consistence; (*d*) Sensitiveness; (*e*) Position; (*f*) Mobility; (*g*) Relations.

(2) *Fallopian Tubes.*

(3) *Ovaries*—(*a*) Size; (*b*) Situation; (*c*) Sensitiveness.

(4) *Peritoneum and Cellular Tissue.*

(5) *Bladder.* (6) *Rectum.* (7) *Pelvic Bones.*

7. Use of—(*a*) Speculum; (*b*) Volsella; (*c*) Sound; (*d*) Curette; (*e*) Aspiratory Needle; (*f*) Tent.

8. Physical Changes in—(*a*) Nervous, (*b*) Respiratory, (*c*) Circulatory, (*d*) Digestive, (*e*) Emunctory Organs; (*f*) Skin; (*g*) Bones.

DIAGNOSIS. PROGNOSIS. TREATMENT.
PROGRESS AND TERMINATION.

In regard to Menstruation as well as abnormal Hemorrhage, we may note that when either follows Amenorrhœa of some weeks' or months' duration it makes us suspect abortion. Hemorrhage coming on after the menopause usually indicates cancer, especially if followed by fetid discharge (*v.* Vol. II., p. 143); patients may complain of bleeding after coitus (Vol. II., p. 144), which is often an early sign of carcinoma. As to Dysmenorrhœa we should note whether the pain is before, during, or after the

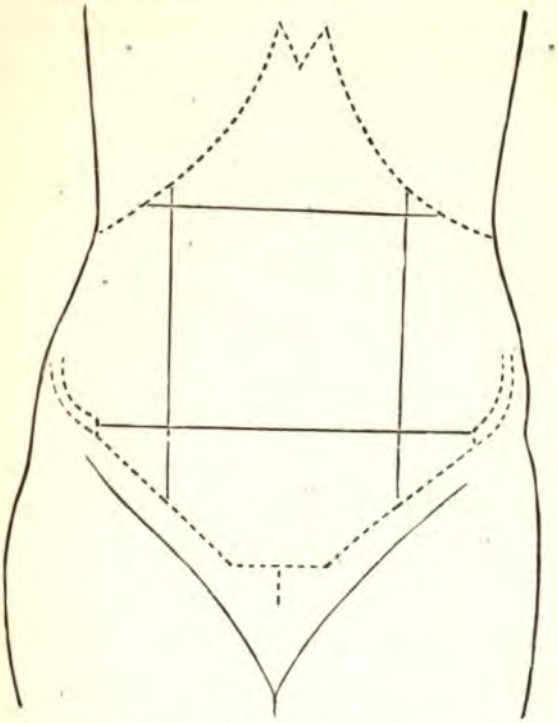

Fig. 399.

Outline diagram of abdomen for recording position of tumours relative to the bony landmaks.[1]

flow; we should also enquire as to clots or shreds discharged, and the latter should be examined microscopically. For the various conditions with which Amenorrhœa, Menorrhagia, and Dysmenorrhœa are associated, see Index under these heads and Chap. XLVIII.

Intermenstrual Discharge.—Ascertain its colour; its amount—whether it requires the use of diapers; and whether it be fetid, watery, or acrid.

[1] The case-taking card and outline diagrams can be had at Maclachlan and Stewart.

Leucorrhœa is present in vaginitis (Vol. II., p. 201), cervical catarrh (Vol. I., p. 293), endometritis (Vol. I., p. 305), and wherever there is secondary catarrh of the uterine mucous membrane as in retroflexion (Vol. II., p. 44) and uterine polypi (Vol. II., p. 124) ; it is also present in Chlorosis (Vol. II., p. 337) and Phthisis. Fetid Leucorrhœa is characteristic of Carcinoma, whether affecting the cervix (Vol. II., p. 144) or body of the uterus (Vol. II., p. 172) ; in Sarcoma, it is not fetid till the later stages (Vol. II., p. 179). For other references to Leucorrhœa, see Index.

Pareunia.—This refers to the absence or presence of pain during coitus (*v.* Vol. II., p. 204). It is enquired into only in special cases, or when

Fig. 400.

Outline diagram of pelvis for filling in position of uterus or tumours (A. R. Simpson).

the patient complains of the pain. For conditions producing dyspareunia, see Index.

Physical Examination.—The *general appearance* and *configuration* should always be noted. The sallow look of the dyspeptic and constipated, yellow appearance of the chlorotic, pinched face of the patient with ovarian cyst, are in some cases helpful in giving the hint as to the line of enquiry. The student should always note anything in the appearance or configuration which may enable him to recognise the diathesis of the patient. It is of importance to ascertain the occurrence of the gouty diathesis in a case of dysmenorrhœa, the tubercular diathesis in chlorosis, and the strumous in syphilis. The physician will be puzzled by the varied complaints of the patient over some slight pelvic inflammatory condition, unless he

note the thin and anxious face of a patient of nervous temperament. Information gained in this way is valuable, but must be used with discrimination. Thus cancerous patients are often florid enough, while a sallow cachectic-looking woman may have some insignificant lesion.

Mammæ.—Note whether vaginal, or those of Pregnancy or Lactation.

The *abdomino-vaginal examination* is the ordinary bimanual. The abdomino-vesico-vaginal is a rare form but useful in some cases (Vol. II., p. 278). The *tent* is not used as a mere diagnostic except in the case of tumours in the cavity of the uterus.

Prognosis.—A great deal depends on this. Thus we have to tell the patient whether her lesion is serious or slight, whether she will get well

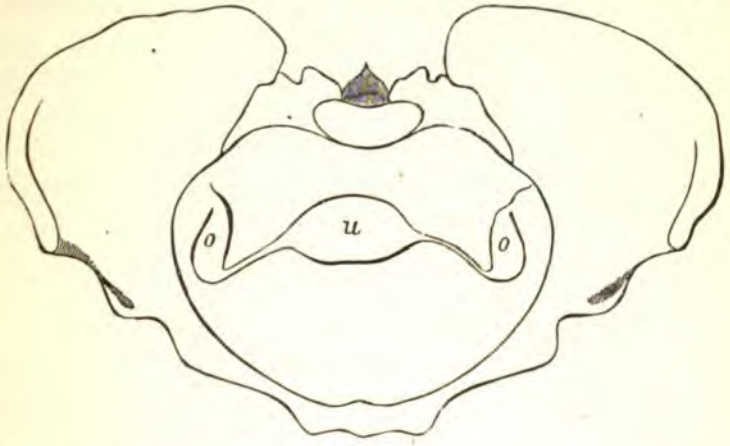

Fig. 401.
Outline diagram of pelvis as seen through the brim, to fill in position of tumours relative to uterus (Schultze).

soon, or if her trouble is chronic but not dangerous. Unless she is told that it is chronic, she may ultimately come to the conclusion that its nature has been misunderstood by the physician. Prognosis is often difficult to give and should always be cautious, especially as to sterility.

Treatment.—In no class of cases has the physician to be so careful not to do harm by his treatment. From the great fact that cellulitis and peritonitis cause or accompany many of the diseases of women, we should first use palliative measures. All operations should be carefully considered, and only undertaken when we feel fairly confident they will benefit and not make the patient worse. The great success of peritoneal operations is now undoubted; but the question as to the actual good resulting from repeated cauterisation of the uterine mucous membrane, division of the

cervix, stitching the cervix, etc., is more *sub lite* than is admitted in many text-books. The problem of how to remove cervical cancer without risk to life and with a fair hope of its non-recurrence is at present being worked out, and the general consensus is that removal of the uterus *per vaginam* gives as yet the best results for the patient's life. Unfortunately the patient has usually recurrence of the disease.

SOURCES OF GYNECOLOGICAL LITERATURE.

At the beginning of each subject we have already given a summary of the literature to which we were indebted; the well-known text-books mentioned below have, to save repetition, been referred to as op. cit. The literature given, therefore, represents what we consider important, and what we had in most cases personally studied.

Gynecological Literature is, however, so extensive that a full resumé of it would have occupied several times the space we have allotted to the whole subject. We wish, however, to point out here the sources, so that any practitioner who wishes to ascertain the best books and monographs on any special subject may know how and where to begin his search.

The sources of Gynecological Literature are threefold:

I. Catalogues, Dictionaries;

II. The larger text-books of Gynecology;

III. Articles and Abstracts in the various Gynecological quarterlies, monthlies, and weeklies, with Retrospects and Jahrbücher.

I. CATALOGUES, DICTIONARIES.

(1.) *Index-Catalogue of the Library of the Surgeon-General's Office, U.S.A.:* Washington, Government Printing Office, 1880. In this splendid work the authors and works are arranged alphabetically; its value cannot be overrated. (*In course of publication.*)

(2.) *Nouveau Dictionnaire de Médecine et de Chirurgie pratiques:* Paris, J. B. Baillière et Fils, 1870.

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Edis—Diseases of Women : London, Smith, Elder & Co., 1881.

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Goodell—Lessons in Gynecology : Philadelphia, Brinton, 1879.

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Tait, Lawson—Diseases of Women : London, Williams & Norgate, 1877.

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West (Duncan's Edition)—Diseases of Women : London, Churchill, 1879.

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Schroeder—Handbuch der Krankheiten der weiblichen Geschlectsorgane : Leipzig, Vogel, 1879.

Billroth's Series.

Bandl, Die Krankheiten der Tuben, der Ligamente des Beckenperitonäum und des Beckenzellgewebes ;

Billroth, Die Krankheiten der weiblichen Brustdrüsen ;

Breisky, Die Krankheiten der Vagina ;

Chrobak, Die Untersuchung der weiblichen Genitalien ;

Fritsch, Die Lageveränderungen der Gebärmutter ;

Gusserow, Die Neubildungen des Uterus ;

Hildebrandt, Die Krankheiten der äusseren weiblichen Genitalien ;

Mayrhofer, Die Sterillität des Weibes ;

Olshausen, Die Krankheiten der Ovarien ;

Winckel, Die Krankheiten der weiblichen Harnröhre und Blase.

(*All published by Enke at Stuttgart.*)

FRENCH.

Bernutz and Goupil—Clinical Memoirs on the Diseases of Women : Sydenham Society Tr., 1866.

Courty—Traité pratique des Maladies de l'utérus : Paris, Asselin, 1866.

De Sinéty—Manuel pratique de Gynécologie : Paris, Doin, 1879.
Leblond—Traité élémentaire de Chirurgie gynécologique : Paris, 1878.

III. JOURNALS; RETROSPECTS.; INDEXES; JAHRBÜCHER.

American Journal of the Medical Sciences : Philadelphia, H. Lea's Son.
American Journal of Obstetrics : New York, Wm. Wood & Co.
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INDEX OF AUTHORS.

AITKEN, LAUCHLAN, i. 176
Allingham, ii. 319
Arnold, i. 241
Arnott, H., ii. 150
Ashford, ii. 5
Atlee, ii. 117
Atthill, i. 312; ii. 74
Aveling, i. 123

BALFOUR, i. 75
Bandl, i. 16, 48, 189, 191; ii. 262, 265, 268, 272
Bannon, ii. 213
Bantock, Granville, i. 202, 235; ii. 59
Barker, i. 280; ii. 141, 150
Barkow, ii. 213
Barnes, i. 121, 253, 273, 275, 298, 313; ii. 40, 66, 71, 75, 90, 124, 146, 150, 151, 161, 204
Battey, i. 91, 116, 200, 202, 203, 206; ii. 277
Bäumler, ii. 327, 329, 330, 331, 332
Bayle, ii. 90
Beck, Snow, ii. 7
Beigel, i. 91; ii. 208
Bennet, Henry, i. 305
Bennett, Hughes, i. 215
Bernutz, i. 160, 163, 175
Berthold, ii. 213
Billroth, ii. 108
Bird, ii. 5
Blau, ii. 136
Blundell, i. 200
Bouqué, ii. 313
Bourdon, i. 175
Bozeman, i. 116, 142; ii. 302
Brandt, ii. 15
Braun, Carl, ii. 14, 263
Braune, i. 51, 68
Breisky, i. 28, 283; ii. 142, 187, 188, 196, 207
Brown, Baker, i. 231
Bruckner, ii. 208
Brunton, Lauder, i. 150
Budin, i. 26
Byford, ii. 298
Byrne, i. 273; ii. 74, 131, 161

CAMPBELL, H. F., ii. 52, 53
Cappie, ii. 85
Chadwick, i. 35
Championnière, i. 72
Cheyne, Watson, i. 171
Chiari, i. 262; ii. 173
Chisholm, ii. 141
Chrobak, ii. 177
Cintrat, ii. 112
Claudius, i. 51
Clay, ii. 179, 181
Coghill, i. 258; ii. 307
Cohnheim, ii. 174
Cohnstein, i. 313
Collis, ii. 335
Courty, ii. 71, 75
Credé, i. 178, 312; ii. 67
Croom, ii. 278
Crosse, ii. 63, 66, 67, 77
Cruveilhier, i. 51; ii. 93
Cullingworth, i. 215
Cunningham, i. 11
Cusco, i. 121

DALTON, i. 87, 91
De Cassis, Vidal, ii. 313
De Morgan, Campbell, ii. 158
De Sinéty, i. 19, 20, 210, 211, 297, 301, 302, 308; ii. 7, 123, 125
Dohrn, ii. 188
Doran, i. 209
Drysdale, i. 215
Düll, ii. 86
Duncan, John, ii. 227
Duncan, Mathews, i. 123, 236; ii. 62, 71, 93, 104, 224, 248, 252, 259, 281
Dunlap, ii. 280

EADE, ii. 86, 94
Eichwald, i. 213
Emmet, i. 114, 123, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 293, 298; ii. 9, 14, 71, 73, 75, 192, 220
Engelmann, i. 89, 91, 202, 206
Englisch, i. 197
Eppinger, ii. 151, 171

FARR, ii. 257
Farre, i. 22
Fehling, ii. 116
Fergusson, i. 118
Finn, ii. 8
Fischel, i. 290
Foster, i. 6, 55, 66, 67
Fothergill, Milner, ii. 339
Foulis, i. 75, 105, 152, 162, 208, 211, 215, 216
Fournier, ii. 333, 334, 335, 336
Fox, Wilson, i. 209
Fränkel, ii. 269
Frankenhäuser, i. 74
Freund, i. 47, 170, 206; ii. 63, 83, 88, 166
Friedreich, ii. 216
Fritsch, i. 292; ii. 23, 25, 33, 38, 40, 42, 61, 64, 65
Frommel, i. 262
Fürst, i. 246

GALABIN, ii. 178
Gallard, ii. 12
Garrigues, i. 31
Gehrung, ii. 35
Gilmore, i. 202, 225
Goltz, i. 150; ii. 291
Goodell, i. 192, 201, 225; ii. 225, 236
Goodsir, ii. 162
Goupil, i. 160
Greenhalgh, i. 258; ii. 29, 105
Guérin, i. 42, 46, 72, 160
Gusserow, ii. 83, 88, 90, 91, 94, 95, 108, 136, 141, 142, 150, 156, 171, 177, 178, 179, 181, 251

Habit, ii. 150
Hamilton, i. 162, 225
Hanks, i. 111, 123, 132, 137, 138
Hanot, ii. 95
Harris, i. 209
Hart, i. 43, 45, 62, 80, 82, 110, 143, 258; ii. 52, 59, 236
Hasse, i. 56, 57
Hecker, ii. 265
Hegar, i. 200, 205, 269, 313; ii. 108, 113, 131, 168, 170, 205, 242
Henle, i. 9, 28, 30, 37, 51
Hennig, i. 15, 252; ii. 66, 268
Hewitt, Graily, ii. 23, 35
Heyfelder, ii. 264
Hicks, Braxton, i. 222; ii. 71, 74, 120
Hildebrandt, ii. 102, 199, 204, 213, 216, 218, 220, 229
Hilton, ii. 317, 320, 321
Hodge, ii. 53
Holden, ii. 221
Holdhouse, ii. 94
Houston, i. 35
Hubert, ii. 95
Hüe, ii. 94, 95
Huguier, i. 274; ii. 215, 235, 242
Hutchinson, Jonathan, i. 230; ii. 174, 327, 332, 335, 336
Hyde, ii. 221
Hyrtl, i. 35, 70, 72

Jackson, Reeves, ii. 15
Jacubash, ii. 178
Jastrebow, i. 219
Jennison, i. 123
Jobert, ii. 295

Kaltenbach, i. 206, 313; ii. 108, 168, 170, 294, 297
Kaschkaroff, ii. 10
Keith, i. 153, 229, 231, 233, 235, 237
Kehrer, ii. 257
Kidd, ii. 94
Kinkead, i. 87
Kiwisch, ii. 6, 268
Klebs, i. 171; ii. 83, 133, 134, 175
Kleeberg, ii. 113
Klemm, i. 313
Klob, i. 262; ii. 6, 90
Koch, i. 171
Koeberlé, i. 183; ii. 108, 116
Kohlrausch, i. 54
König, i. 49, 172
Kroner, ii. 73
Kuchenmeister, i. 142, 258; ii. 32
Kundrat, i. 89, 91
Kunert, ii. 177
Kussmaul, ii. 264
Küster, ii. 88
Küstner, ii. 208

Lancereaux, ii. 327, 330
Landau, i. 135
Le Bec, i. 46, 73, 160
Leblond, i. 313
Lee, i. 278, 283; ii. 333
Leopold, i. 73, 90, 91; ii. 82, 116
Lister, i. 144, 145, 233, 234; ii. 192
Loewenhardt, i. 91
Lorey, ii. 83
Löwenstein, i. 28
Luschka, i. 12, 29, 48, 51
Lusk, i. 74, 162

M'Clintock, ii. 96
Macdonald, Angus, ii. 5, 71
Macintosh, i. 256; ii. 29
Malassez, i. 210
Malgaigne, ii. 146
Marckwald, i. 269
Martin, i. 206; ii. 14, 88, 241
Mayer, ii. 219
Meyer, ii. 213
Miner, i. 235
Mitchell, Weir, i. 169; ii. 14
Möricke, i. 91
Müller, ii. 177
Mundé, i. 135, 139, 197, 199, 225, 278, 280, 282; ii. 35, 48
Murphy, ii. 95

Nélaton, i. 175, 229
Neugebauer, i. 119
Nieberding, i. 280, 282
Noeggerath, i. 162, 187, 188, 208, 210; ii. 6, 71, 73, 77, 278
Nonat, i. 160

Oldham, ii. 122, 190
Ollivier, i. 175
Olshausen, i. 195, 301, 302, 306, 307, 308, 312
Otto, ii. 214

Pallen, i. 278, 280, 283; ii. 261
Paquelin, i. 147, 148
Parkes, ii. 276
Patenko, i. 209
Pawlik, ii. 282
Péan, i. 231; ii. 108, 111
Pichot, ii. 172
Picot, ii. 141
Pflüger, i. 208
Pirogoff, i. 40, 47, 54
Pott, Percival, i. 196
Puech, ii. 188, 196

Quain, i. 75, 97

Rainey, i. 17
Ramsbotham, ii. 214
Recamier, i. 139, 140, 175
Recklinghausen, i. 171
Reid, W. L., ii. 261
Rein, ii. 117
Remmann, ii. 5
Richet, i. 15
Ricord, ii. 327, 331
Rindfleisch, i. 211
Rokitansky, i. 191, 209; ii. 22, 61, 265
Roser, i. 277, 278
Routh, i. 258, 304, 307; ii. 157
Ruedinger, i. 37, 47, 56, 97; ii. 318
Ruge, i. 19, 20, 278, 289, 290, 301; ii. 40, 133, 134, 142, 148, 171, 198, 199

Sappey, i. 15, 73
Savage, i. 202, 258
Scanzoni, ii. 5, 6, 14, 61, 217
Schlesinger, i. 50
Schroeder, i. 15, 65, 68, 178, 211, 215, 229, 283, 299, 301, 303; ii. 5, 23, 34, 74, 82, 85, 90, 95, 108, 110, 136, 141, 149, 150, 163, 164, 169, 170, 171, 172, 177, 186, 190, 197, 198, 207, 220, 236, 263
Schultze, i. 53, 55, 57, 68, 135, 170, 193, 256, 296; ii. 23, 86
Seyfert, ii. 151
Sibley, ii. 141
Simon, i. 106, 108, 139, 140, 144, 269; ii. 158, 278, 300, 313
Simpson, A. R., i. 80, 82, 110, 123, 130, 140, 162, 202, 206, 270, 310; ii. 52, 61, 64, 76, 77, 95, 102, 106, 151, 161, 176, 177, 179, 193, 207, 228, 278, 341
Simpson, Sir J. Y., i. 122, 131, 132, 160, 257, 262, 264, 277, 312; ii. 24, 29, 30, 88, 103, 130, 139, 140, 150, 154, 158, 160, 162, 172, 212, 214, 215, 220, 221, 303, 305
Sims, i. 82, 114, 123, 132, 139, 140, 200, 205, 206,

233, 256, 268, 269; ii. 20, 24, 30, 32, 107, 164, 205, 241, 299
Skene, i. 30; ii. 275, 280, 284
Slavjansky, i. 209, 304
Smith, Albert, ii. 53, 56
Smith, Heywood, i. 297
Smith, Protheroe, i. 123
Smith, Tyler, ii. 71
Solowieff, ii. 251
Späth, ii. 263
Spiegelberg, i. 43, 47, 211, 283; ii. 79, 117, 148, 208
Steurer, i. 162, 170
Stiegele, ii. 220
Storer, ii. 318
Sutton, i. 281

TAIT, LAWSON, i. 91, 132, 137, 138, 183, 187, 190, 201, 202, 235, 236; ii. 76, 129
Tate, ii. 71, 75
Taylor, i. 15; ii. 62
Thiersch, ii. 134
Thomas, i. 123, 139, 140, 225, 260, 273, 296, 299; ii. 6, 9, 13, 32, 33, 35, 55, 71, 74, 76, 86, 105, 106, 108, 111, 161, 194, 195, 202, 217
Thornton, i. 232, 235; ii. 108
Tillaux, ii. 87
Tilt, ii. 205
Times, ii. 84
Trenholm, i. 202
Turner, i. 18, 35, 75; ii. 85

UFFELMAN, i. 29, 30
Underhill, ii. 122, 123

VAN BUREN, ii. 319
Van de Warker, i. 57
Veit, i. 19, 20, 278, 289, 290; ii. 133, 134, 142, 148, 207
Virchow, i. 47, 169, 178; ii. 6, 22, 82, 84, 90, 117, 133, 134, 174, 337
Voisin, i. 175, 182
Von Preuschen, ii. 206, 207
Von Sigismund, ii. 332

WALDEYER, i. 75, 208, 211; ii. 133, 134
Warner, ii. 248
Wegner, ii. 335
Wells, Spencer, i. 205, 229, 230, 232, 235, 237; ii. 79, 108, 111
West, i. 236; ii. 220
White (of Buffalo), ii. 71, 74
Whitehead, i. 262
Williams, i. 88, 89, 91; ii. 60, 157, 251
Wilson (of Baltimore), i. 148
Wilson, W., ii. 267
Wiltshire, i. 236
Winckel, i. 275; ii. 38, 90, 199, 275, 297, 298, 299

ZWANCK, ii. 237

INDEX OF SUBJECTS.

Note.—As the student will see in the *Table of Contents* the details of each special subject, we give only one reference—in bold figures—to the pages where each subject is specially treated of. Passing references in other parts of the book, are given fully.

Thus, for the "Pathology of Carcinoma Uteri," see "Carcinoma Uteri" in *Table of Contents;* for references to carcinoma, not contained in the chapter on carcinoma, see Index.

For instruments figured in text, see *Instruments* in *Classified List of Illustrations.*

ABDOMEN, distention of, in ovarian tumour, i. 220
Abdominal contents, relation to skin, i. 96
examination, i. **95**
pressure, action on uterus, ii. 16
regions, i. 96
section for pelvic abscess, i. 183
section in hæmatocele, i. 179
Abortion, ii. **258**
and endometritis, i. 304, 305, 306, 308, 309
causing pelvic peritonitis, i. 161
in retroflexion, ii. 43, 44
cause of subinvolution, ii. 8, 9
and syphilis, ii. 335
Abscess, pelvic, i. 170, 172
opened by cautery, i. 174
tapping of, i. 174
of uterine wall, ii. 5
Adhesions, limiting hæmatocele, i. 176
diagnosis in ovarian tumours, i. 223
treatment in ovarian tumours, i. 232
Age, influence on carcinoma, ii. 139, 141
influence on fibroid tumours, ii. 90, 91
in relation to menstruation, i. 85
Amenorrhœa, ii. 247
due to atresia, ii. 189
in chlorosis, ii. 337
physiological, ii. 248
in superinvolution, i. 262
Ampulla of Fallopian tube, i. 21
Amputation of cervix, i. 268
of cervix hypertrophied in prolapsus, i. 276
of inverted uterus, ii. 77
Anæmia in hemorrhagic endometritis, i. 305, 306
Anæsthetics, i. **149**
Anteflexion of uterus, ii. 17, 19, 20
and small fibroid tumour, ii. 99
pathological, i. 107, 170
Anteflexion, pathological, mistaken for retroversion, ii. 21, 39
passage of sound in, i. 127
Anteversion of uterus, ii. 18, 19, **33**
due to chronic metritis, ii. 33
Antiseptics in gynecology, i. 144
Antiseptic douche, i. 145
Anti-thermic shield, i. 148
Anus, i. 36
fissure of, ii. 319
fissure of, producing vaginismus, ii. 203
Areolar hyperplasia of cervix, i. 293
of uterus, ii. 6
Arsenic in membranous dysmenorrhœa, ii. 253
Ascites and ovarian tumours, i. 220
Ascitic fluid, in malignant ovarian disease, i. 161, 211, 216
Asphyxia from chloroform, i. 152
Atresia of cervix uteri, i. **252**
of cervix, senile, i. 303
in septate uterus, ii. **196**
of vagina, ii. **185**, 186
dangers of operation for, ii. 192
Atrophy of cervix and uterus, i. **261**
congenital, of uterus, i. 245, 246, 251
Auscultation, i. 98

BACTERIA, in cellulitis, i. 171
in erysipelas, i. 171
Baden-Baden waters in chronic metritis, ii. 13
Ballottement in extra-uterine gestation, ii. 268
Barnes' ointment-positor, i. 313
speculum for vaginal tampons, i. 298
Bartholinian glands, i. 5, 10
cysts of, ii. 218
inflammation of, ii. 215
abscess in, ii. 218

Battey's operation, i. 91, **200**
in dysmenorrhœa, ii. 253
Benzoate of ammonia in cystitis, ii. 288
Bimanual examination, i. **101**
in anteflexion, ii. 26
in early pregnancy, ii. 12
in inversion, ii. 67
position of hands in, i. 101
to replace retroflexed uterus, ii. 49
in retroflexion, ii. 46
in retroversion, ii. 39
with sound, i. 130
for stone in bladder, ii. 290
in uterine displacements, ii. 20
Bladder, anatomy of, i. **29**; ii. 275
affection of, in carcinoma, ii. 136, 138
in amputation of cervix, i. 276
attachment to anterior vaginal wall, i. 63
calculi in, ii. 290
changes in, after fistula, ii. 296
changes in position of, i. 34
diastole of, i. 34
dilated, in carcinoma, ii. 139
displacements of, ii. **285**
displacements of, in extra-uterine gestation, ii. 271
displacements of, in retroflexed gravid uterus, ii. 260
distended, and ovarian tumours, i. 221, 223
functional diseases of, ii. **291**
injuries to, in ovariotomy, i. 233
ligaments of, i. 34
malformations of, ii. 283
methods of exploring, ii. **277**
physiology of, ii. 276
neoplasms of, ii. **286**
position, i. 29
position in inversion of uterus, ii. 65
pressure on, by fibroid tumour, ii. 94
in retroflexion, ii. 42
shape when empty, i. 32
shape in fœtus, i. 33
structure, i. 30
systole and diastole of, ii. 276
effect of its distention on the uterus, i. 58; ii. 16, 17, 37
Blaud's pills in chlorosis, ii. 338
Blistering of the cervix uteri, ii. 13
Blood effusion into pelvis, i. 176
Blood-vessels of pelvis, i. **69**
Bougies, graduated, to dilate cervix, i. 256
Breisky's instruments for operating in atresia, ii. 195
Bright's disease in fibroid tumour, ii. 95
Broad ligament, i. 41
affections of, i. 192
anatomy, i. 17, **41**
blood effusion into, i. 177
cellular tissue of, i. 45
position, i. 42
Bromide of potassium in chronic metritis, ii. 13
in fibroid tumours, ii. 103
Bromide of potassium in ovaritis, i. 195
Bromine solution in carcinoma, ii. 155, 157
Bulbocavernosi, i. 9
Bulbi vaginæ, i. 9

Cachexia in carcinoma, ii. 145
in sarcoma, ii. 179
Calcification of fibroid tumours, ii. 88
Calculi in bladder, ii. **290**
Cancer (see Carcinoma).
Carbolic acid in cervical catarrh, i. 297
in endometritis, i. 309
in pruritus vulvæ, ii. 218
Carcinoma, of bladder, ii. 286
of cervix, ii. **132, 143, 153**
cure by amputation, ii. 161
commencement in cervix, i. 296
duration of life in, ii. 150
and endometritis, i. 308
of Fallopian tubes, i. 191
in male and female compared, ii. 140
affecting fibroid tumours, ii. 89
combined with sarcoma, ii. 175
diagnosis from sarcoma, ii. 180
spontaneous cure of, ii. 150
of body of uterus, ii. **171**
of vagina, ii. **208**
of vagina, secondary, ii. 138
of vulva, ii. **220**
Carlsbad salts, ii. 13
Case-taking, method of, ii. **341**
A. R. Simpson's card for, ii. 342
Cataleptic convulsions and lacerated cervix, i. 281
Catarrh of cervix, i. 288
of cervix, diagnosis from vaginal, i. 295
of Fallopian tube, i. 190
of uterus, i. 300
Catarrhal patches, i. 291
Catheter, methods of passing, ii. 277
Skene-Goodman, ii. 289
stationary, for fistula, ii. 311
Cauliflower excrescence, ii. 133, 146
Caustics producing atresia, i. 252
in carcinoma, ii. 157
Cautery in dividing cervix, ii. 105
in incising capsule of fibroid, ii. 105
in laparotomy for fibroids, ii. 111
in ovariotomy, i. 231
Paquelin's, i. 147
in opening vaginal cysts, ii. 208
Cellular tissue of pelvis, hemorrhage into, i. 179 (*v.* Connective tissue).
Cellulitis, pelvic, i. **169**
and anteflexion, ii. 27
diagnosis from anteversion, ii. 34
producing anteversion, ii. 33
and lacerated cervix, i. 279
relation to peritonitis, i. 160
and retroflexion, ii. 46
in utero-sacral ligaments, ii. 23
Cervical catarrh in lacerated cervix, i. 281
catarrh with retroflexion, ii. 40
mucus, character of, i. 294

Cervical plug, Thomas', i. 260
polypus, ii. 122
Cervix, amputation of, i. 268; ii. 159
amputation of, in carcinoma, ii. 158
amputation of, in prolapsus, i. 276
amputation of, producing involution, ii. 14
anatomy, ii. **122**
atrophy of, i. **261**
atresia of, i. **252**; ii. 190
atresia of, operation for, ii. 195
atresia of, senile, i. 303
dilated above stenosis, i. 253
dilatation of, i. 256
division of, in cervical catarrh, i. 297
antero-posterior division of, ii. 30
bilateral division of, i. 256, 257; ii. 30
cancer of (see Carcinoma).
carcinoma of, ii. **132, 143, 153**
catarrh of, i. **288**
chronic thickening of, i. 267, 291
conical, i. 253
closure for vesico-uterine fistula, ii. 309
descent in prolapsus, ii. 232
dilatation of, i. 133; ii. 104
displacement in retroflexed gravid uterus, ii. 260
examination of, i. 99
fibroid tumour of, ii. 80, **89**
glands of, i. 19
hypertrophy of, i. **253**, 266
hypertrophy of, in prolapsus, ii. 234
induration of, in carcinoma, ii. 148
in infantile uterus, i. 245, 251
position in inversion, ii. 62
laceration of, i. **277**
laceration producing cervical catarrh, i. 293
mucous membrane of, i. 19
normal structure contrasted with pathological i. 292
position in retroversion + retroflexion, ii. 39
rupture in atresia, ii. 189
stenosis of, i. 252
in superinvolution, i. 262
supra-vaginal amputation of, ii. 159, 163
vaginal aspect of, i. 20
Chancre, hard and soft, ii. 330
Channelled polypus, ii. 122
Chloral in carcinoma, ii. 155
Chloride of zinc in carcinoma, ii. 165
Chloroform, action of, i. 149
death from, i. 152
Chlorosis, ii. **337**
amenorrhœa in, ii. 247
leucorrhœa in, i. 304
small uterus in, i. 246, 261
Cholera and endometritis, i. 304
Chromic acid, in cervical catarrh, 297
in endometritis, i. 311
Chronic metritis and fibroid tumour, ii. 98
Cintrat's serre-nœud, ii. 109, 112
Clamp in ovariotomy, i. 230
disadvantages of, i. 231
in laparotomy for fibroids, ii. 111
Cleavage in pelvic floor, lines of, i. 63
Clitoris, anatomy, i. 4
development of, ii. 212
Cloaca, ii. 211
persistence of, ii. 212
Colpitis, ii. 198
emphysematosa, ii. 199
Conception in an undeveloped horn, i. 248
Constipation, ii. **322**
in fistula, ii. 298
Connective tissue of pelvis, i. **44**
of pelvis, as seen in sections, i. 45
studied by injections, i. 48
spread of carcinoma in, ii. 136, 138
relation to cellulitis, i. 170, 172
of uterus, increase of in metritis, ii. 7
Connective-tissue origin of cancer, ii. 134
Coccygeus, i. 11
Coccygodinia, ii. **323**
Corpus luteum of menstruation and pregnancy, i. 87
Cradle-pessary of Graily Hewitt, ii. 35
Credé's method of expressing placenta, ii. 66
Curette, i. **139**, 309
nail, A. R. Simpson's, ii. 106
Recamier's, i. 140
Simon's, i. 140
Sims', i. 140
Thomas', i. 140
in carcinoma, ii. 158
in cervical catarrh, i. 299
in endometritis, i. 308, 311
in diagnosis of small polypi, ii. **127**
in sarcoma uteri, ii. 180, 182
Cystic fibroid tumours, ii. 116
Cystitis, ii. **287**
Cystocele, ii. 286
in prolapsus, ii. 234
Cysts in the cervix, i. 291, 292
Cystoma ovarii, i. 211
Cysto-fibroma, ii. 116

DECIDUA, in extra-uterine gestation, ii. 265
Defecation, mechanism of, ii. 317
difficult in hæmatocele, i. 180
difficult in retroflexed gravid uterus, ii. 260
painful, ii. 34
painful in carcinoma, ii. 146
painful in retroflexion, ii. 43, 44
want of control, in ruptured perineum, ii. 226
Dermoid cysts, i. 212
Development, intra-uterine periods of, i. 246
of pelvic organs, i. **74**
of uterus, period of, i. 241
Diabetes, pruritus in, ii. 216
Diagnosis, sound in, i. 128
volsella in, i. 112

Diathesis, strumous, tubercular, or syphilitic, i. 309
Diet in carcinoma, ii. 155
in peritonitis, i. 165
Weir Mitchell's system of, ii. 14
Digestive derangements in endometritis, i. 305, 306
Dilatation of cervix, i. 133 ; ii. 173
by rapid method, ii. 129
Dilators, Tait's and Hank's, i. 137
various forms of, i. 256, 257
Diphtheritic inflammation and carcinoma, ii. 148, 149
Discharge, fetid, in carcinoma, ii. 247, 134
in carcinoma of body of uterus, ii. 172
watery, in sarcoma uteri, ii. 179
Discus proligerus, i. 25
Displacements of pelvic floor, i. 64; ii. 231
of uterus, ii. 16
due to cellulitis, i. 169, 173
due to hæmatocele, i. 176, 181
due to ovarian tumours, i. 218
due to peritonitis, i. 173
relation to chronic metritis, ii. 10
relation to endometritis, i. 304, 305
diagnosis with sound, i. 128
etiology, ii. 19
physiological and pathological, ii. 17
symptoms of, ii. 19
produced by volsella, i. 112
Douche, antiseptic, i. 145
forms of, i. 146
Douglas, pouch of, i. 40
Drainage of abscess, i. 174
after Battey's operation, i. 203
in extirpation of uterus, ii. 168
in ovariotomy, i. 233
Drop-cork for chloroform, i. 151
Dysmenorrhœa, ii. 249
in anteflexion, ii. 24
mechanical and congestion theories of, ii. 24, 25
relation to Battey's operation, i. 200
in cellulitis, i. 174
in stenosis of cervix, i. 254
in endometritis, i. 305, 306
in fibroid tumours, ii. 94
in uterine polypi, ii. 124 125
in retroflexion, ii. 44
membranous, ii. 251
obstructive, i. 253
spasmodic, ii. 250
Dyspareunia in anteflexion, ii. 25, 26
in peritonitis, i. 164
causes, ii. 204
definition, ii. 204
in prolapsed ovary, i. 198
treatment, ii. 204

ECRASEUR, in amputating cervix, i. 273
mode of application, ii. 160
for removal of ovaries, i. 203
Ecraseur, for removal of polypi, ii. 131
and galvano-cautery, relative advantages, ii. 159
Ectropium of cervix, i. 291
Elastic ligature in amputating uterus, ii. 79
in laparotomy for fibroids, ii. 111, 114
Electrolysis in ovarian tumour, i. 225
Elythrytis, ii. 198
Emaciation in carcinoma, ii. 145
Emmet's operation for lacerated cervix, i. 283
Ems, waters of, in endometritis, i. 313
in chronic metritis, ii. 13
Endometritis, i. 300
relation to abortion, i. 306
in anteflexion, ii. 26, 27
leading to chronic metritis, ii. 9
diagnosis by sound, i. 128
changes in final stage of, ii. 124
fundal, i. 304, 307
fungosa of Olshausen, i. 302, 308, 312
hemorrhagic type and carcinoma of the body, ii. 173
and sarcoma, ii. 180
secondary to stenosis of cervix, i. 254
three types of, i. 301
Enterocele, vaginal, ii. 242
Enucleation of fibroid tumours, spontaneous, ii. 82, 86, 95
artificial, ii. 105
of ovarian tumours, i. 235
Epispadias, ii. 214
Epithelial origin of cancer, ii. 134
Epithelioma of the cervix, ii. 132
Erector clitoridis, i. 9
Ergot and endometritis, i. 309 ; ii. 102
methods of administration in menorrhagia, ii. 248
Ergotine, hypodermic injection of, ii. 103
in treatment of fibroids, ii. 102
Erosion, follicular, i. 290
and lacerated cervix, i. 279
papillary, i. 289
papillary and carcinoma, ii. 148
simple, i. 289, and Plate VIII., i. 295
Ether, i. 149
Ethidene, i. 149
Eversion of lips of cervix, i. 279, 282, and Plate VIII., i. 295
Examination of cases, ii. 345
posture in, i. 82
Exanthemata and endometritis, i. 303, 304
vaginitis in, ii. 200
atresia vaginæ after, ii. 188
External genitals, anatomy, i. 3
development, i. 75 ; ii. 211
relation in erect posture, i. 6
examination of, i. 98
lymphatics of, i. 72
Extirpation of uterus, through abdominal walls, ii. 166
through vagina, ii. 169
Extra-uterine gestation, ii. 262, 265
and fibroid tumour, ii

Extra-uterine causing hæmatocele, i. 168; ii. 271
Exudations in the pelvis, i. 171
course of, i. 172
Epithelial cells found in carcinoma, ii. 146, 147

FACIES, cancerous, ii. 144
Fallopian tubes, anatomy, i. 20
abnormalities, i. 188
blood-sacs in, ii. 186
catheterisation of, i. 188
development of, i. 74
distention with pus or blood, i. 190
divisions, i. 21
functions, i. 187
inflammation of, i. 189
palpation of, i. 187
patulous condition of, i. 189
position, i. 20
removal by abdominal incision, i. 190
affected with sarcoma, ii. 177
stricture of, i. 188
gestation in, ii. 262
structure, i. 21
tumours of, i. 191
Fatty degeneration around polypoidal fibroid, ii. 61
in fibroid tumour, ii. 88
Fevers causing ovaritis, i. 194
Fibro-cystic tumours of the uterus, ii. 116
and ovarian tumours, i. 222
Fibroid tumour of uterus, ii. 80, 92, 102
producing anteflexion, ii. 23
and anteflexion, ii. 27
Battey's operation for, i. 201
and carcinoma, ii. 141
and chronic metritis, ii. 11, 97
and extra-uterine gestation, ii. 267, 268
+ inversion, ii. 66
pediculated submucous, ii. 119
sloughing and carcinoma, ii. 148, 149
and retroflexion, ii. 46
sarcomatous degeneration of, ii. 176
and sarcoma, ii. 180
spontaneous expulsion of, ii. 121
Fibroid tumours of vagina, ii. 207
tumour of cervix, ii. 80, 89
Fibromata of vulva, ii. 220
Fibro-myoma uteri, ii. 80
Fibrous tumour of uterus (*v.* Fibroid).
Fimbriated end of Fallopian tube, i. 21
Flexions of uterus, ii. 17
Flooding, producing superinvolution, i. 262 (*v.* Hemorrhage).
Fœtal heart, in diagnosing pregnancy, ii. 12, 100
Fœtal life, malformations arising in, i. 247
Fœtus in detached horn of uterus, i. 250
Forceps and lacerated cervix, i. 278
used for extracting fibroids, ii. 107
and fistula, ii. 297
and ruptured perineum, ii. 224, 225
Fornices, condition of, in peritonitis and cellulitis, i. 172
Fornices, effect on uterus of digital pressure in, i. 82
examination of, i. 101
position of, in hypertrophied cervix, i. 273
Fossa navicularis, anatomy, i. 5
irritability producing vaginismus, ii. 203
Freund's extirpation of uterus, ii. 166
Friedrichshall water, ii. 13

GALVANO-CAUSTIC WIRE in removal of polypi, ii. 130
for amputation of inverted uterus, ii. 78
in amputating cervix, i. 273
compared with ecraseur, ii. 159
mode of application, ii. 160
Gastro-elytrotomy, i. 31
Gehrung's anteversion pessary, ii. 35
Genito-crural nerve, affection in ovarian tumour, i. 219
Genupectoral posture, i. 78 *et seq.*
to replace retroflexed gravid uterus, ii. 261
in replacing retroverted uterus, ii. 52
Germinal vesicle, i. 25
Gestation, abdominal, ii. 262, 263, 271
in detached horn, i. 249, 250; ii. 263
in Fallopian tube, ii. 262 *et seq.*
interstitial, ii. 264
in a septate uterus, i. 249
in an undeveloped horn, i. 249, 250
Glycerine plug, making of, i. 196
Gonorrhœa, causing ovaritis, i. 194
causing cystitis, ii. 287
causing peritonitis, i. 162
causing vaginitis, ii. 201
and endometritis, i. 304
latent in the male, i. 162
and metritis, ii. 4
Gonorrhœal vaginitis, diagnosis from simple, ii. 201
Gouty diathesis and dysmenorrhœa, ii. 253
Graafian follicles, development, i. 208
distention of, i. 209
number, i. 24
position, i. 24
rupture of, i. 85
structure, i. 25
Greenhalgh's intra-uterine stem, ii. 29
pessary for prolapsus, ii. 236

HÆMATOCELE, pelvic, i. 175
and rupture of extra-uterine gestation, ii. 266, 267, 271
and fibroid tumour, ii. 100
Hæmatoma, i. 179
of vulva, ii. 221
Hæmatosalpinx, i. 191
Hemorrhage in amputation of cervix, i. 269
in carcinoma uteri, ii. 143
in carcinoma of body of uterus, ii. 172
causing death in carcinoma, ii. 150, 152

Hemorrhage in carcinoma, treatment of, ii. 154
in fibroid tumours, ii. 92, 93
fatal from fibroid tumours, ii. 93
internal, in operation for atresia, ii. 192
intra-peritoneal and extra-peritoneal, i. 179
in inversion of uterus, ii. 66
into the peritoneum of pelvis, i. 175
post-partum, i. 283
in sarcoma uteri, ii. 178, 179
in uterine polypi, ii. 124
Heart, action of chloroform on, i. 150
Hernia and hydrocele, i. 191
Hegar's amputation of cervix, i. 269
method of laparotomy for fibroids, ii. 112
Heredity, influence on carcinoma, ii. 139
Hermaphroditism, ii. 212
false, ii. 213
true, ii. 213
Hernia of fibroid tumour, ii. 85
Hernia of ovary, i. 196
Hernial nature of prolapsus, ii. 235, 242
Hewitt's (Grailly) cradle-pessary, ii. 35
Higginson's syringe, i. 146
Hodge pessary, ii. 52, 53
mode of action, ii. 58
Houston, valve of, i. 35
Hunyadi Janos water, ii. 13
Hydatid of liver and ovarian tumour, i. 221, 223
Hydramnios and ovarian tumour, i. 221, 222
Hydrargyri pernitratis liquor in cervical catarrh, i. 297
Hydrocele of round ligament, i. 191
Hydronephrosis in cystitis, ii. 287
in carcinoma, ii. 136
Hymen, atresia of, ii. 185
development of, ii. 188
forms of, i. 3, 6
imperforate, operation for, ii. 192
persistent or inflamed, producing vaginismus, ii. 203
Hypodermic injection of morphia, i. 167
Hydro-peritoneum and Battey's operation, i. 302
Hydrops folliculorum, i. 211
tubæ, i. 190
Hyperplasia, areolar, of uterus, ii. 6
of cervix, i. 293
Hypertrophy, primary, of cervix, i. 266
secondary, of cervix, i. 266, 273
Hypospadias, ii. 212
Hysteria, due to ovaritis, i. 195
small uterus in, i. 245
in superinvolution, i. 262
Hystero-epilepsy and Battey's operation, i. 301

Ice-bags in hæmatocele, i. 182
Ice-cap, i. 284
Ice-cot, i. 284
Ice in peritonitis, i. 168
Incontinence of urine, ii. 291
India-rubber ring to control hemorrhage, i. 284
Infarct of uterus, ii. 5
Inflammation of uterus, i. 300
in muscular coat of uterus, ii. 3
of peritoneum and cellular tissue, i. 159
puerperal, ii. 4
Inflammatory deposits in fibroid tumour, ii. 100
Infundibulo-pelvic ligament, i. 23
Inguinal glands, i. 72, 73
affection in carcinoma, ii. 138
Injections, intra-uterine, in endometritis, i. 313
into uterus and tubes, i. 189
dangers of, i. 190
Interstitial metritis, ii. 6
Inter-ureteric ligament, i. 32
Intestinal obstruction due to fibroid tumours, ii. 94
Intestines, in pouch of Douglas, i. 59
relation to uterus and pelvic floor, i. 59
Intra-abdominal pressure, upon pelvic floor, i. 59, 76
in prolapsus, ii. 233, 234
action on rectum, ii. 317
Intra-uterine galvanic stem, i. 264
Inversion of uterus, ii. 61
caused by fibroid tumour, ii. 88
diagnosed from fibroid tumour, ii. 97
diagnosed from pedunculated fibroid inflammatory adhesions, ii. 127
mechanism of, ii. 61
in prolapsus, ii. 234
in sarcoma, ii. 177
Inverted uterus, amputation of, ii. 77
replacement of, Barnes' method, ii. 75
Courty's method, ii. 75
Emmet's method, ii. 71
Lawson Tait's method, ii. 76
Noeggerath's method, ii. 73
Tate's method, ii. 75
Thomas' method, ii. 74
White's method, ii. 74
Involution and operations on cervix, i. 283
senile, i. 289
Iodide of potassium, in syphilis, ii. 333
in chronic metritis, ii. 13
Iodine in cervical catarrh, i. 297
in endometritis, i. 311
Involution artificially produced by amputation of cervix, ii. 14
Iodoform, in vaginismus, ii. 204
in pruritus vulvæ, ii. 218
Isthmus, of uterus, i. 14
of Fallopian tube, i. 21

Kissingen waters in chronic metritis, ii. 13
Knives, i. 142

Kolpokleisis, ii. 313
Kreuznach waters, in endometritis, i. 313
in chronic metritis, ii. 13
in treatment of fibroids, ii. 104
Kuchenmeister's scissors for dividing the cervix, i. 259

Labia Majora, anatomy, i. 3
Minora anatomy, i. 4
development, ii. 212
Labour, atony of uterus in third stage of, due to chronic metritis, ii. 10
rapidity of, and lacerated cervix, i. 280
complicated by polypus, ii. 124, 125
protracted, producing fistula, ii. 297
Laceration of cervix, i. 277
and cellulitis, i. 170
and subinvolution, ii. 8, 9
of perineum, ii. 223
Lactation, effect on uterus if protracted, i. 262
and subinvolution, ii. 8, 9
Laminaria tents, i. 133, 136
Laparotomy, for extra-uterine gestation, ii. 268
for fibroid tumours, ii. 108
Lateri-version of uterus, ii. 18
Leeches, application of, to cervix, i. 298
in peritonitis, i. 168
Leucorrhœa, as a symptom, ii. 344
in anteflexion, ii. 24, 26
in cervical catarrh, i. 290, 293, 294
in chlorosis, ii. 339
in chronic metritis, ii. 9
in endometritis, i. 301, 305
in hypertrophied cervix, i. 267
in lacerated cervix, i. 281
in retroflexion, ii. 42, 43
in uterine polypi, ii. 124
in vaginitis, ii. 201
in vaginal cysts, ii. 207
producing pruritus, ii. 216
Levator ani, i. 12
Ligature in ovariotomy, i. 231
Lineæ albicantes, i. 95
Lipomata of vulva, i. **220**
Listerism, in gynecology, i. 144, 148
in ovariotomy, i. 234
Literature, gynecological, sources of, ii. **345**
Lithia water, in pruritus, ii. 217
salts of, in irritable bladder, ii. 291
Lithopædion, ii. 267
Locomotion impaired in uterine inflammation, ii. 33
Lymph, coagulable, from fibroid tumour, ii. 116
Lymphatics, relation to cellulitis, i. 170, 172
of external genitals, i. 68
in fibroid tumours, ii. 82
dilatation of, in fibroid tumours, ii. 116
relation to septicæmia, i. 73
of uterus, i. 73
dilatation of, in metritis, ii. 7
Lymphatics of vagina, i. 73
Lymphatic glands of pelvis, i. **72**
in carcinoma, ii. 136

Malformation of uterus, i. 241
rectal examination in, i. 250
Malignant peritonitis, i. 161
Marckwald's amputation of cervix, i. 269, 270
Marriages, average productivity of, ii. 257
Marriage and syphilis, ii. 333
Massage, i. 169
general, in uterine disease, ii. 14
in pathological anteflexion, ii. 28
uterine, ii. 14
Medullary cancer, ii. 132
Membrana granulosa, i. 24
Menopause and Battey's operation, i. 206
changes in cervix after, i. 252
changes in uterus after, i. 261, 303
changes in vagina after, ii. 200
influence on fibroid tumours, ii. 90, 101
premature, ii. 247
Menorrhagia, ii. **248**
in anteflexion, ii. 24, 26
in carcinoma, ii. 144
in lacerated cervix, i. 281
in stenosis of cervix, i. 254
in chronic metritis, ii. 9
in endometritis, i. 301, 305
in fibroid tumour, ii. 92
in hæmatocele, i. 179
in inversion, ii. 66
in ovaritis, i. 195
in peritonitis, i. 163
in uterine polypi, ii. 124
in retroflexion, ii. 44
in retroversion, ii. 38
in treatment by Battey's operation, i. 201
Menstruation, i. **85** *et seq.*
and Battey's operation, i. 206
irregular, in cervical catarrh, i. 293, 294
diminished in chronic cellulitis, i. 170
and endometritis, i. 301, 309
absence in fistula, ii. 298, 315
during gestation, i. 248
relation to hæmatocele, i. 175
and metritis, ii. 3, 4
periodicity and duration, i. 86
descent of polypus during, ii. 121
in an undeveloped horn, i. 248
in bicornuous and septate uterus, i. 248
Menstrual blood, composition, i. 86
origin, i. 88
quantity, i. 87
character of retained, ii. 188
Mercury in syphilis, ii. 312
Metritis, i. 300
acute, ii. **3**
chronic, ii. **5**
Metrotome, various forms, i. 257

Metrotome, Sir Jas. Simpson's, i. 257
Micrococci in wounds, i. 171
Microscope, in carcinoma uteri, ii. 146
in endometritis, i. 301
in sarcoma-uteri, ii. 180
Micturition, ii. 275
difficult, in advanced extra-uterine gestation, ii. 267
difficult in fibroid tumour, ii. 94
difficult in hæmatocele, i. 180
difficult in prolapsus, ii. 232
difficult in retroflexion of gravid uterus, ii. 260
frequent, i. 291
frequent in cystitis, ii. 287
frequent in fixation of uterus, ii. 33
frequent in vaginit
painful, in carcin
Mobility of uterus, as
i. 128
Morcellement in fibro
Morgagni, columnæ a
Morphia, methods of
methods of adm
nosis, ii. 155
caution as to use
ii. 252
Mucoid degeneration,
117
in sarcoma, ii. 17
Mucous membrane of
of cervix, i. 19
of rectum, i. 35
of urethra, i. 29
of uterus, i. 17
of vagina, i. 26; ii. 197
Mucous polypi, ii. 119, 122
Musculature of bladder, i. 30
of rectum, i. 35
of urethra, i. 29
of uterus, i. 17
Myoma uteri, ii. 80
Myxomatous degeneration of fibroids, ii. 88

NABOTHIAN ovula, i. 291
Nabothian follicles, i. 294
pediculated, ii. 119, 124
Nail curette, A. R. Simpson's, ii. 105
Needles, i. 143, 203
Nelaton's forceps, i. 229
Nervous derangements in endometritis, i. 305, 306
reflex symptoms, and lacerated cervix, i. 280, 281
system, action of chloroform on, i. 149
Neuralgia from pressure by fibroid tumours, ii. 94
in lacerated cervix, i. 281
Neuromata of vulva, ii. 230
Nitrate of silver in endometritis, i. 312
Nitric acid in endometritis, i. 310, 312
in carcinoma, ii. 147

OBTURATOR gland, i. 72, 75
Oophoritis, i. 194
Opiates in dysmenorrhœa, ii. 252
Omental tumours and ovarian, i. 221, 223
cells found in fluid from, i. 215
Os externum, contracted, i. 253, 255, 267; ii. 22
examination of, i. 99
position, i. 14, 20
Os internum and utero-vesical fold of peritoneum, i. 273
Os uteri, form in nulliparæ and multiparæ, i. 257
Ovarian artery, course, i. 69
in removal of fibroids, ii. 110
in extirpation of uterus, ii. 167
Ovarian corpuscles, i. 215
fimbria, i. 23
id, i. 212
tation, ii. 262, 263
ament, i. 23
xus, of veins, i. 72
tumours, cystic, i. **207, 217, 224**
extra-uterine-gestation, ii. 267, 268
fibroids, ii. 100
ocystic, ii. 118
lignant, i. **215**
ition of, i. 97
sing peritonitis, i. 161
d, i. **215**
omy, i. 225
pared with laparotomy for fibroids, 44
mal, i. 200
, i. **194**
and Battey's operation, i. 203
Ovaries, anatomy, i. 22
arterial supply, i. 69
degeneration of blood-vessels, i. 208
development, i. 74, 216
displacements, i. 196
epithelial tubes, i. 210
examination, i. 107
inflammation, i. 194
ligaments, i. 22
malformations, i. 193
malignant development of connective tissue, i. 211
measurements, i. 22
changes at menstrual period, i. 87
effect on menstruation, i. 91
palpation of, i. 195
position, i. 22, 57
position in inversion, ii. 62
position in retrodexion, ii. 41
prolapsed and retrodexion, ii. 47
removal by abdominal section, i. 304
removal by per vaginam, i. 303
structure, i. 23
in supernumeration, i. 202
tumours of, i. 207
in rudimentary uterus, i. 342, 350
in uterus unicornis, i. 243
Ovulation, i. 87
with rudimentary uterus, i. 343
Ovum, formation of membrana granulosa, i. 215

Ovum, structure, i. 25
passage into uterus, i. 87

PAIN, in endometritis, i. 305, 306
in carcinoma uteri, ii. 144
in carcinoma of body of uterus, ii. 172
in cervical catarrh, i. 293, 294
in inversion, ii. 66
in retention of menses in atresia, ii. 189
in ovaritis, i. 195
in acute and chronic peritonitis, i. 163
in peritonitis, i. 167
in prolapsed ovary, i. 197
in retroflexion, ii. 42, 43
in sarcoma uteri, ii. 178
Palpation, method of, i. 96
Pampiniform plexus, i. 72
in extirpation of uterus, ii. 168
Parametric tissue, i. 47
Parametritis, i. 169
chronica atrophicans, i. 170
posterior, of Schultze, i. 170
Paravesical pouch of peritoneum, i. 57
Parenchymatous inflammation, ii. 5
Parovarium, i. 22
development, i. 75
distention, i. 191
Parovarian fluids, nature of, i. 215
tumours and ovarian, i. 222
Parturition, repeated, and carcinoma, ii. 141
and endometritis, i. 304
and ovaritis, i. 194
Péan's method of laparotomy for fibroids, ii. 111
needle for pedicle, ii. 112
Pedicle, changes in, after ligature, i. 231
treatment in fibroid tumours, ii. 109
treatment in extra and intra-peritoneal methods compared, ii. 110
of ovarian tumour, i. 211
examination, i. 221
torsion, i. 234
treatment in ovariotomy, i. 230
Pedunculation of fibroid tumours, ii. 86
Pelveo peritonitis, i. 160
Pelvic abscess, i. 170, 172
bursting of, i. 173
Pelvic cellulitis, i. **169**
Pelvic connective tissue, i. **44**
Pelvic floor, general anatomy, i. **7**
structural anatomy, i. **60**
displacements, i. 63; ii. **231**
preventing downward displacement, ii. 17
affected by genupectoral posture, i. 77
intra-abdominal pressure on, i. 64, 76
loose tissue, ii. 231
measurements on external surface, i. 6
muscles, i. 8
opening up of, in genupectoral posture, i. 63
opening up of, in parturition, i. 63
relation to parturition, i. 60, 77
Pelvic floor projection, i. **65**
callipers for measuring, i. 67
measurements, i. 66
effect of pregnancy on, i. 68
Pelvic floor segments, i. 61
contrast between, i. 61
as affected by genupectoral posture, i. 79
in parturition, i. 61
Pelvic glands, i. 72
Pelvic inflammation producing displacement, ii. 18, 19
after stem pessary, i. 265
and subinvolution, ii. 8, 9
Pelvic peritonitis, i. **159**
producing anteflexion, ii. 22
with anteversion, ii. 34
producing small uterus, i. 262
Pelvis, blood-vessels of, i. 69
coronal sections, i. 47
section in genupectoral posture, i. 81
horizontal sections, i. 46
lateral sagittal section, i. 45
lymphatics, i. 72
nervous supply, i. 74
venous plexuses, i. 70
Perchloride of iron to check hemorrhage, i. 154
caution as to use, i. 154
Percussion, method of, i. 98
ovarian tumour and ascites, i. 220
Perforation into peritoneal cavity in carcinoma, ii. 138, 150
Perimetritis, i. 160
Perineal body, i. 9, **37**
structure, i. 37
measurements, i. 37
Perineal muscles, i. 9
Perineum, arterial supply, i. 70
Perineum, development, ii. 212
rupture, ii. 222
central rupture, ii. 223, 224
operative treatment, ii. 225, 239
support in parturition, ii. 525
Periovaritis, i. 196
Peritoneum, anatomy of, i. **37**
of bladder, i. 39, 42, 64
of bladder in parturition, i. 62
of broad ligaments, i. 41
in carcinoma, ii. 138
in amputation of cervix, i. 276
in prolapsus, ii. 232
in fistula, ii. 296
in inversion, ii. 63, 64
method of opening into, i. 204
in relation to operations, i. 43
in parturition, i. 43
on sides of pelvis, i. 42
local divisions on pelvic floor, i. **56**
and rectum, i. 43
in retroflexion, ii. 41
of uterus, i. 17, 39
on posterior vaginal wall, i. 40
vesico-uterine pouch of, i. 39
Peritonitis, pelvic, i. **159**

Peritonitis and carcinoma, ii. 151
relation to cellulitis, i. 160
malignant, cells found in fluid from, i. 215
after uterine injections, i. 189
producing retroversion, ii. 37, 38
Pessary, intra-uterine, ii. 29
intra-uterine in retroflexion, ii. 60
vaginal, Albert Smith, ii. 52, 54, 58
vaginal anteflexion, ii. 32
vaginal anteversion, ii. 35
vaginal, in chronic metritis, ii. 11
vaginal, effect on position of uterus, i. 82
vaginal, in fibroid tumour, ii. 104
vaginal, Hodge, ii. 52, 53, 58
vaginal, mode of introduction, ii. 54, 55
vaginal, medicated, composition of, ii. 202
vaginal, in pregnancy, ii. 59
vaginal (Mundé's), for prolapsed ovaries, i. 199
vaginal ring, ii. 236
vaginal, Zwanck's, ii. 238
Pflüger's ducts, a source of ovarian tumours, i. 208
Phthisis, amenorrhœa in, ii. 247
uterus in, i. 261
Physics of abdomen and pelvis, i. **76**
Piles, ii. 321
Placenta, in extra-uterine gestation, ii. 265
growth, after death of the fœtus, ii. 269, 270
treatment, ii. 269
portions retained, and carcinoma, ii. 148, 149, 153
relation to inversion, ii. 61, 62, 66
Placental polypi, ii. 119, **124**
Polypes à apparitions intermittentes, ii. 122
Polypi of uterus, ii. **119**
and endometritis, i. 304
fibrous, ii. 119
producing Fallopian-tube gestation, ii. 125, 266
diagnosis from inversion, ii. 68
producing inversion, ii. 61, 62, 66
+ inversion, diagnosis of, ii. 70
mucous, ii. 119, **122**
mucous and fibrous contrasted, ii. 125
placental, ii. 119, **124**
Polyptome, Sir J. Y. Simpson's, ii. 130
Porte-caustique, i. 312
Posterior fornix, effect of pressure on, ii. 59
Posture, relation to examination and treatment, i. 82
of patient in cellulitis and peritonitis, i. 172
Pouch of Douglas, i. 40, 57
intestines in, i. 59
Pregnancy, advanced, and fibroid tumour, ii. 100
early, diagnosis, ii. 11
Pregnancy, early, from fibroid tumour, ii. 97, 99
early, characters of uterus, ii. 10
diagnosis from chronic metritis, ii. 11
diagnosis from ovarian tumour, i. 221
uterus dilated from atresia, ii. 190
fissuring of cervix in, i. 280
course in an extra-uterine gestation, ii. 266
complicated by large fibroid tumours, ii. 98
+ ovarian tumour, i. 223, 236
hypertrophy of cervical glands in, i. 292
and syphilis, ii. 334
anteversion of uterus in, ii. 33
sympathetic phenomena of, in uterine polypus, ii. 125
Prognosis in gynecological cases, ii. 345
Presentation of head and lacerated cervix, i. 278
Prolapse of ovary, i. **197**
Prolapsus uteri, i. 77, ii. **231**
due to fibroid, ii. 90
+ inversion, ii. 69, 71
mechanism, ii. 232
retroversion in, ii. 37
Pruritus vulvæ, ii. **215**
in carcinoma, ii. 145
Pseudocyesis and ovarian tumour, i. **221**, 223
Puberty, changes at, i. 86
symptoms of atresia at, ii. 188
Pubic segment, of pelvic floor, i. 61
displacements, i. 64
in bimanual examination, i. 102, **105**
in semi-prone posture, i. 117
Puerperal inflammation, ii. 3
inversion, frequency of, ii. 65
Puerperium, rapid development of carcinoma in, ii. 148, 149, 173
and endometritis, i. 308
and inversion, ii. 61, 65
and peritonitis, i. 161
and retroflexion, ii. 42
and retroversion, ii. 37
and subinvolution, ii. 9
Pulse, in hæmatocele, i. 180
peritonitis, i. 164
Pyosalpinx, i. 190

Rake for removing sutures, i. 273
Rectal examination, i. **106**
in atresia, ii. 189
in carcinoma, ii. 146
in hypertrophied cervix, i. 268
in inversion, ii. 67
in pathological anteflexion, ii. 26
in retroflexion, ii. 46
in superinvolution, i. 264
in uterine malformations, i. 249
Simon's method, i. 108
Recto-abdominal examination, i. 105, **106**, 107
Rectocele, ii. 319

Rectocele and prolapsus, ii. 234
Recto-vaginal fistula, ii. 322
Recto-vagino-abdominal examination, i. 105
Rectum, anatomy, i. 34
diseases of, ii. 318
examination, ii. 313
pressure on, by fibroid tumour, ii. 94
lymphatics of, i. 74
physiology, ii. 317
position, i. 34
in retroflexion, i. 41
structure, i. 35
ulceration in carcinoma, ii. 136
displacing uterus, ii. 16
connection with the vagina, i. 35, 63
Reflex action and chloroform, i. 149, 152
Reinversion of stump of amputated uterus, ii. 79
Renal calculi, ii. 289
tumours and ovarian, i. 221, 223
Respiratory centre in chloroform, i. 149
Retention of urine, ii. 291
producing cystitis, ii. 260, 287
due to fibroid tumour, ii. 94
due to extra-uterine gestation-sac, ii. 269
due to retroflexed gravid uterus, ii. 260
Retroflexion, ii. 17, 18, 19, 39
and cervical catarrh, i. 293
congenital, ii. 40, 41
and small fibroid tumour, ii. 91
relation to retroversion, ii. 38
of gravid uterus, ii. 44, 259
and extra-uterine gestation, ii. 265, 267
Retro-pubic fat deposit, i. 44, 61
Retro-uterine hæmatocele, i. 175
Retroversion, ii. 18, 19, 36, 39
passage of sound in, i. 125
caused by peritonitis, i. 169
action of pessary on, ii. 58, 59
physiological and pathological, ii. 17, 37
in prolapsus, ii. 233
Retroversion + Retroflexion, ii. 18, 19, 39
Rheumatic diathesis and dysmenorrhœa, ii. 253
Ring pessary, ii. 236
with diaphragm, ii. 236
mode of introduction, ii. 236
position in vagina, ii. 237
Rosenmüller, organ of, i. 22
Round ligament, anatomy of, i. 17
hydrocele, i. 191
a guide to parts of uterus, i. 244

SACRAL SEGMENT of pelvic floor, i. 61
rupture of inferior angle, ii. 223
the supporting one, i. 64; ii. 222, 234
supporting pessary, ii. 59
Salpingitis, i. 189
Sarcoma of ovary, cells found in fluid from, i. 215
Sarcoma of uterus, ii. 174
of uterus and carcinoma, ii. 148, 149
of uterus and endometritis, i. 308
of uterus and inversion, ii. 66
of vagina, ii. 208
Sarcomatous degeneration in polypus, ii. 123
Scarification of cervix, i. 298
Schroeder's operation for cervical catarrh, i. 283, 298, 299
Schultze's dilator, i. 256
Scirrhous cancer, ii. 132
Scissors, i. 142
Bozeman's, i. 142
for division of cervix, i. 258
Hart's, i. 142; ii. 32
Kuchenmeister's, i. 143
Scrofula, leucorrhœa in, i. 304
Semi-prone posture, i. 82, 116
Septic matter causing cellulitis, i. 170
Septicæmia, after amputation, ii. 78
after operation for atresia, ii. 192
in carcinoma, ii. 150, 151
from suppuration of fibroid tumours, ii. 96
in laparotomy for fibroids, ii. 109
in inversion of uterus, ii. 71
relation of lymphatics to, i. 73
and metritis, ii. 5
after ovariotomy, i. 234
after tents, i. 137
Septic peritonitis, i. 161, 166
Serre-nœud of Cintrat, ii. 109, 112
in laparotomy for fibroids, ii. 110, 112
Serous peritonitis, i. 163, 168
Serum, collection in Fallopian tubes, i. 190
Sexual excess and endometritis, i. 304
Sickness after chloroform, i. 152
Silk-worm gut, i. 144
Silver-wire sutures, i. 144
Simon and Marckwald's amputation of cervix, i. 269
Simon's sharp spoon, ii. 158
Simpson's (A. R.) amputation of cervix, i. 270
nail-curette, ii. 105
sound, i. 123
modification of Thomas's curette, i. 140
volsella, i. 110
Simpson's (Sir J. Y.) division of cervix, i. 257; ii. 30
galvanic intra-uterine stem, i. 264; ii. 29
metrotome, i. 256
sound, i. 122
volsella for fibroids, ii. 107
Sims' (Marion) division of cervix, ii. 30, 31
amputation of cervix, i. 269
dilator, i. 256
enucleator, ii. 106
speculum, i. 117, 295
operation for vaginismus, ii. 204
Skene-Goodman catheter, ii. 288
Smith (Albert) pessary, ii. 52, 54

Smith (Albert) pessary mode of action, ii. 58
Souffle, uterine in fibroid tumour, ii. 99
absence of, in ovarian tumour, i. 220
Sound, uterine, i. 122
combined with bimanual, i. 130
in anteflexion, ii. 27
in hypertrophied cervix, i. 268
in endometritis, i. 307
in small fibroid tumours, ii. 97
in pediculated submucous fibroid, ii. 126
in inversion, ii. 69
in polypus and inversion, ii. 128
in polypoidal fibroid, ii. 100, 126
in chronic metritis, ii. 11
in retroflexion, ii. 46
in superinvolution, i. 264
in uterine displacements, ii. 20
method of dressing, i. 297, 310
in replacing retroflexion, ii. 46
in treating anteflexion, ii. 29
Spray in ovariotomy, i. 235
Specula, vaginal, comparative advantages of various forms, i. 121
Barnes's crescent, i. 120
Battey's, i. 116, 117
Bozeman's, i. 115
Cusco's, i. 121
Fergusson's, i. 118
Neugebauer's, i. 119
Sims's, i. 115
Speculum, anal, ii. 318
intra-uterine, i. 312
urethral and vesical, ii. 280
Spencer Wells's clamp, i. 230
trocar, i. 229
Sphincter ani, externus, i. 37
internus, i. 37
tertius, i. 35
operation to restore, ii. 227
Sponge tents, i. 132
in abortion, ii. 259
Stem, galvanic intra-uterine, i. 264
in anteflexion, ii. 27
Sterility, ii 257
in anteflexion, ii. 24, 25
in cellulitis, i. 170
in cervical catarrh, i. 293, 294
in hypertrophied cervix, i. 267
in stenosis of cervix, i. 254
in dyspareunia, ii. 203
in endometritis, i. 305, 306
in stricture of Fallopian tubes, i. 188
in fibroid tumour, ii. 90, 95
in fistula, ii. 298
in chronic metritis, ii. 10
in peritonitis, i. 164
in double ovaritis, i. 195
in uterine polypi, ii. 124, 125
in retroflexion, ii. 43
Strumous diathesis and endometritis, i. 308
Subinvolution, ii. 3, 6
and lacerated cervix, i. 279
with retroflexion, ii. 40
Superfœtation, i. 249
Superinvolution, i. 262
due to ovaritis, i. 194
Supra-vaginal portion of cervix, hypertrophy of, i. 266, 272, 273
Supra-vaginal amputation of the cervix, ii. 133
Suppuration after cellulitis, i. 174
after hæmatocele, i. 183
Sutures, i. 144
removal of, i. 272
Sympathetic pain in ovaritis, i. 195
Syringe, Higginson's, i. 146
Syphilis, ii. 327
producing abortion, ii. 258
producing ulceration of perineum, ii. 224
Syphilitic ulceration and carcinoma, ii. 148

TAIT'S graduated dilators, ii. 129
Tangle and tupelo tents, i. 133, 136
Tapping in cellulitis, i. 174
hydrocele, i. 191
ovarian tumours, i. 224
peritonitis, i. 168
Temperature, reduction of, i. 168
Tenaculum, Sims's, i. 114
in diagnosing lacerated cervix, i. 282
Tents, i. 132
dangers of, i. 256
in stenosis of cervix, i. 256
Thomas's anteversion pessary, ii. 37
cervical plug, i. 260
clamp for pedicle of fibroid tumours, ii. 112
spoon-saw, ii. 106
Torsion for removal of polypi, ii. 130
Trachelorrhaphy, i. 283
Treatment, operative, in gynecology, ii. 345
sound in, i. 129
specula in, i. 114
volsella in, i. 113
Triangular ligament, i. 10
Trigone of bladder, i. 30, 32
Trocars for tapping ovarian cysts, i. 229
Tubal gestation, ii. 262
Tubo-ovarian cysts, i. 192
gestation, ii. 263
Tubercular diathesis in superinvolution, i. 262
Tumours, pelvic, and chronic metritis, ii. 9
Type of menstruation, i. 86

ULCERATION of cervix, so-called, i. 281, 288
true, i. 291
Upright posture, i. 6, 78, 79
Uræmia in carcinoma, ii. 150
in fibroid tumour, ii. 95
Ureter, anatomy of, i. 31, 57
catheterisation, ii. 281
relation to cervix and urethra, ii. 296
dilatation in carcinoma, ii. 186
dilatation due to cicatrisation, ii. 41
compression by fibroid tumours, ii. 94

Ureter, relation to gastro-elytrotomy, i. 31
opening of, i. 30
Uretero-uterine fistula, ii. 294, 297, 299
Uretero-vaginal fistula, ii. 295, 297, 299
Urethra, anatomy of, i. 28
atresia in fistula, ii. 296, 309
caruncle, ii. 283
development, ii. 212,
dilatation, ii. 283
direction, i. 29
exploration, ii. 277
glands, i. 30
malformations, ii. 283
neoplasms, ii. 283
pressure on, by fibroid tumour, ii. 94
relation to vaginal wall, i. 62
Urethral orifice, i. 3
Urethritis, ii. 284
Urethro-vaginal fistula, ii. 294, 298
+atresia of urethra, ii. 311
Urination, physiology of, ii. 275
Urine, normal composition, ii. 276
character in cystitis, ii. 287
incontinence and retention, ii. 291
incontinence in fistula, ii. 298
Uro-genital sinus, ii. 211
persistence of, ii. 212
Utero-sacral ligaments, anatomy of, i. 17
cicatricial contraction in, i. 169; ii. 23
function compared with pessary, ii. 42, 58
stretching of, in retroflexion, ii. 42
Uterine artery, course, i. 70
in extirpation of uterus, ii. 167
in removal of fibroids, ii. 110
Uterine cavity, variations in length of, i. 128
contractions, importance in diagnosis, i. 222; ii. 100
disease, etiology of, ii. 340
mucous membrane in long-standing endometritis, i. 303
changes in, at menstrual period, i. 86
plexus of veins, i. 72
Uterus, absent, or rudimentary, i. 242, 243, 247, 248, 249
amputation at os internum, ii. 109
anatomy, i. 14
anteflexion, ii. 17, 19, 20
anteversion, ii. 18, 19, 33
atrophy, i. 261
arterial supply, i. 70
bicornis, i. 244, 247, 248, 250
carcinoma, ii. 132, 143, 153, 171
changes after birth, i. 247
congenital atrophy, i. 245, 246, 251
curetting, i. 141
development, i. 74
didelphys, i. 244, 247, 250
dilatation in atresia, i. 185
dilatation and perforation in carcinoma, ii. 150
displacement, ii. 16
displacement in extra-uterine gestation, ii. 267, 270
Uterus, displacement in large fibrous polypi, ii. 120
displacement in hæmatocele, i. 176, 181
displacement in ovarian and uterine tumours, ii. 118
displacement in peritonitis and cellulitis, i. 169
enlargement of, in endometritis, i. 307
extirpation of, through abdominal walls, ii. 166
extirpation of, through the vagina, ii. 169
changes in extra-uterine gestation, ii. 265, 266
evacuation after abortion, ii. 259
effect of digital pressure in fornices, i. 82
fibroid tumour, ii. 80, 92, 102
changes with fibroid tumour, ii. 86
fibro-cystic tumours, ii. 116
changes in, at angle of flexion, ii. 22, 40
glands, i. 18
hypertrophy, i. 266
hypertrophy in prolapsus, ii. 232, 233
infantile, i. 245, 247, 251
inflammation (endometritis, metritis), i. 300, 304
inversion, ii. 61
spontaneous reinversion, ii. 70
lateri-version, ii. 18
ligaments, i. 17
lymphatics, i. 73
malformations, i. 241
massage, ii. 15
measurements, i. 15
mobility, i. 57, 110
mobility range, i. 59
changes in, at menstrual period, i. 87
periods at which morbid conditions arise in, i. 239
mucous membrane, i. 18
musculature, i. 18
nervous supply, i. 74
peritoneum of, i. 17
polypi, ii. 119
position, means of ascertaining, i. 54
position, with distended bladder, i. 54
position, normal, i. 53
position, physiological changes in, i. 57; ii. 17
position, relation to viscera, i. 51
prolapse, ii. 231
retroflexion, ii. 17, 19, 39
retroflexion of gravid, ii. 44
retroversion, ii. 18, 19, 37, 39
sarcoma, ii. 174
septus, i. 245, 247, 248, 250
septus, atresia of, ii. 196
shape, i. 13
form in section, i. 16
structure, i. 17
subinvolution, ii. 6, 8, 9
superinvolution, ii. 262

Uterus, support of, i. 64
unicornis, i. 242, 246, 248, 250

VAGINA, anatomy, i. 25
arterial supply, i. 70
atresia, ii. 185
cancer of, primary, ii. 207
cancer of, secondary, ii. 188
cicatrisation after fistula, ii. 206
cicatrisation after labour, ii. 189
artificial closure for fistula, ii. 213
congenital bands in, ii. 197
cysts, ii. 205
development, i. 74
dilatation in atresia, ii. 186
direction in upright posture, i. 25
fibroid tumours, ii. 207
form in section, i. 29
in genupectoral posture, i. 80
inflammation of, ii. 196
lymphatics, i. 73
change after menopause, ii. 200
plugging to check hemorrhage, ii. 154
sarcoma, ii. 208
structure of, i. 27
relation of walls, i. 60
Vaginal cleft, i. 61
columns, i. 26
examination, i. 98
glands, i. 26
glass-plugs, ii. 194
Vaginal orifice, anatomy, i. 3
dilatation of, ii. 205
division of sphincter, ii. 205
fissures around, producing vaginismus, ii. 203
Vaginal portion of cervix, hypertrophy of, i. 266. 273
Vaginal walls, connection of, i. 62
inversion in prolapsus, ii. 232
length, i. 26
Vaginismus, ii. 203
Vaginitis, ii. 198
diphtheritic, ii. 198, 200
gonorrhœal, ii. 198, 200, 201
senile, ii. 198, 200
Varicose veins, due to fibroid tumours, ii. 94
Varix of vulva, ii. 221
Veins, pelvic, compressed by fibroid tumours, ii. 94
rupture of, i. 168
Venereal excess, causing peritonitis, i. 162
Venous sinuses round fibroid tumours, ii. 82, 93
Venous thrombosis in carcinoma, ii. 150, 152
Versions of uterus, ii. 17, 18
Vesico-uterine fistula, ii. 204, 207, 209, 209
Vesico-vaginal fistula, ii. 186, 188, 204
artificial, for cystitis, ii. 208
Vesico-vaginal septum, ii. 204
Vesico-vagino-abdominal examination, i. 105
Vestibule, anatomy, i. 3
development of, ii. 212
Vichy waters in chronic metritis, ii. 13
Volsella, description, i. 110
examination with, i. 108
Hart's, i. 112
A. R. Simpson's, i. 111
Sir J. Y. Simpson's, for fibroids, ii. 107
with speculum, i. 117
in superinvolution, i. 264
for introducing tents, i. 135
in replacing uterus, ii. 51
Vomiting in hæmatocele, i. 180
peritonitis and cellulitis, i. 173
Vulva, atresia of, ii. 212
carcinoma, ii. 219
cysts, ii. 217
elephantiasis, ii. 219
fibromata, ii. 220
hæmatoma, ii. 221
hemorrhage from varicose veins, ii. 221,
inflammation, ii. 215
lipomata, ii. 220
malformations, ii. 211
neuromata, ii. 220
pruritus of, ii. 215
varix, ii. 221
Vulvitis, ii. 215
of children, ii. 215

WATER injections, into connective tissue, i. 48
Weir Mitchell's treatment of chronic uterine disease, i. 169; ii. 14
White's repositor for inversion, ii. 73
Wiesbaden waters in chronic metritis, ii. 13
Wire sutures in amputation of cervix, i. 271
Wolffian bodies, i. 74

ZONA pellucida, i. 25
Zwanck's pessary for prolapsus, ii. 237

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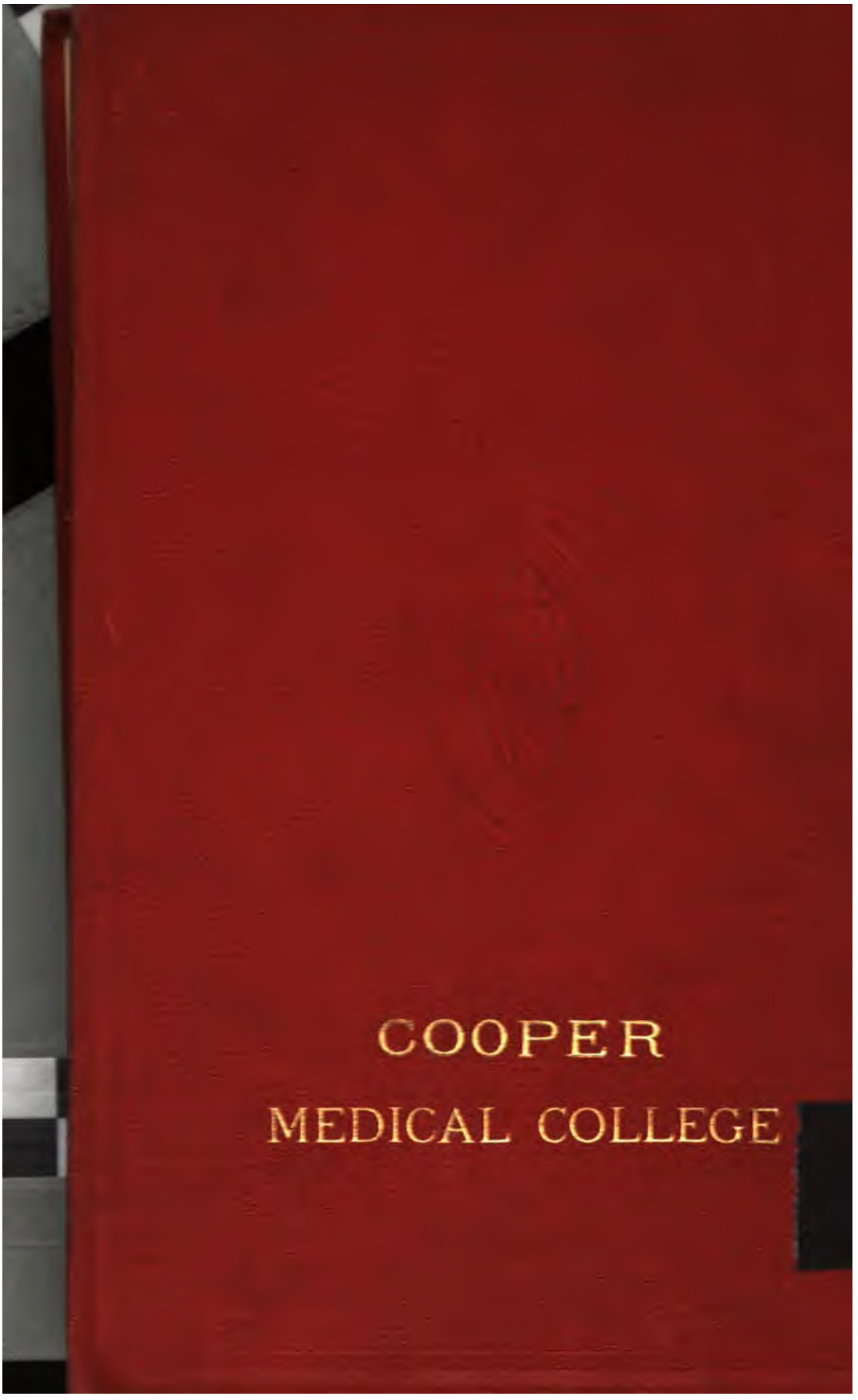
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